THE JOURNAL

OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

CONTENTS.—AUGUST, 1915.

DEPARTMENT OF AGRICULTURE, VICTORIA

RED POLL DAIRY HERD

YOUNG BULLS FOR SALE

TO VICTORIAN DAIRYMEN

DAM.	Date of Birth.	RECORD OF DAM.				PRICE.
		Milk lbs.	Average Test.	Fat lbs.	Butter lbs.	
	Sired by "NICOTINE" by ACTON DEWSTONE (imp.)					
Havana ...	17.8.14	6365	4·15	264·3	301¼	13 Guineas
Kentucky ..	21.8.14	7905	3·96	313·3	357¼	15 ..
Connecticut ...	3.4.15	6780	5·36	364·0	415	18 ,,
Vuelta ...	25.4.15	7750	6·24	485·1	553	24 ,,
Cameo ..	23.5.15	5454	5·15	281·2	320¼	14 ,,
Sumatra ...	24.5.15	9062	4·67	423·4	482¾	21 ,,
	Sired by "GANYMEDE" by HONINGHAM ALAKE (imp.)					
Laurel ...	12.12.14	Heifer.	No Record.			5 ,,
	Sired by "THE SPANIARD" by ACTON DEWSTONE (imp.)					
Marcia ...	22.5.15	Heifer.	No Record.			5 ..

The prices are based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter ***fat*** yielded.

For History and Record of the Herd see Journal of Agriculture, September, 1914.

Calves under six months old may be purchased for delivery at that age.

Inspection by arrangement with Mr. E. STEER, Herdsman, Central Research Farm, Werribee.

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DRY-FARMING INVESTIGATIONS IN THE UNITED STATES.

By Lyman J. Briggs, M.S., Ph.D.

In charge of Biophysical Investigations, United States Department of Agriculture.

Presented before Section M of the British Association for the Advancement of Science, Melbourne, Australia, 1914.

The term "dry-farming" is now generally applied to agricultural practice in regions where rainfall is the primary limiting factor in crop production. The determination of the tillage methods which are most efficient in the storage and conservation of moisture, and the development of varieties which are specially suited to dry-land conditions, are economic problems worthy of the best efforts of the agronomist. The most efficient methods are not always the most profitable methods, for the margin of profit in dry-farming is normally small, and the cost of tillage must always be compared with the return. Efficiency in the use of the limited rainfall is, however, the basis upon which dry-farming practice must be built.

Before taking up the discussion of dry-farming investigations in the United States, a word regarding the organization of the Department of Agriculture in this connexion may be of interest. Five offices in the Bureau of Plant Industry are devoting a large part of their energies to dry-farming problems. The Office of the Dry Land Agriculture operates over a score of experimental farms in various sections of the Great Plains. This office is concerned chiefly with the determination of the crop rotations and tillage methods which are best adapted to the various dry-farming sections. It was early recognised in the development of this work that dry-farming problems are often of an extremely

local character, and that numerous experimental stations are necessary to cover the field. Each experimental farm is superintended by a trained agriculturist, usually an agricultural college graduate. These farms also afford experimental facilities for other offices engaged in dry-farming problems. The offices of the Cereal Investigations, Forage Crop Investigations, and Alkali and Drought Resistant Plant Investigations, are engaged in the investigations of crops suited to dry land conditions; while the Office of Biophysical Investigations, in co-operation with the above-named offices, is concerned with the study of the influence of various tillage methods on the absorption and retention of rainfall, the water requirement of crops under field conditions, and the influence of climatic conditions on the growth of dry-land crops. Over £50,000 is now appropriated annually by Congress for the support of the dry-land work. In addition to this, several of the States are also conducting dry-farming investigations on an extensive scale, either independently or in co-operation with the Government. The field of investigation is so extensive that the present paper will be confined largely to the biophysical phases of the work.

Dry-farming Areas in the United States.

Two great dry-farming areas occur in the United States. One, the inter-mountain area, lies between the Rocky Mountains on the east and the Sierra Nevada Mountains on the west. It is essentially a region of winter and spring rainfall. The other, the Great Plains area, extends from the Canadian boundary along the eastern side of the Rocky Mountains nearly to the Mexican boundary, and embraces over 200,000 square mile of land whose productivity is limited by the rainfall. This area, in contrast to the other, is a region of summer rainfall.

These two great areas differ greatly in their physiographic features and in their native plant cover. The inter-mountain district is broken into numerous valleys, and the vegetation consists mainly of shrubby perennial plants, such as the sagebush (*Artemisia tridentata*) (Plate I.), and a salt-bush (*Atriplex confertifolia*). The size and character of this vegetation affords a good index of the productivity of the the land* The larger the sagebrush the greater the water supply, and the better the farm. The soils occupied by salt-bush, on the other hand, are apt to be so saline in character as to be unsuited to dry-farming.

In the Great Plains no trees or shrubs are found, except along the water-courses, while the gently undulating grass-covered plain stretches unbroken to the horizon, save for the buildings of the settlers. Much of this country is covered with buffalo grass (*Buchloë dactyloides*) and grama grass (*Bouteloua oligostachya*), while farther to the east, where the rainfall is somewhat heavier, the taller bunch grass (*Andropogon scoparius*) and wire grass (*Aristida longiseta*) make their appearance.†. This striking difference in the vegetation, characterized by the shrubby plants in the inter-mountain districts, and by grasses on the plains,

* Indicator significance of vegetation in Tooele Valley, Utah. Kearney, Briggs, Shantz, McLane, and Piemeissel *Journal of Agricultural Research*, United States Department of Agriculture, I., page 365, 1914.

† Shantz, H. L. Natural vegetation as an indicator of the capabilities of land for crop production in the Great Plains area. United States Department of Agriculture, Bureau of Plant Industry, Bulletin 201, 1911.

reflects the difference in the distribution of the annual rainfall, which has had a marked effect upon the dry-farming development of the two sections.

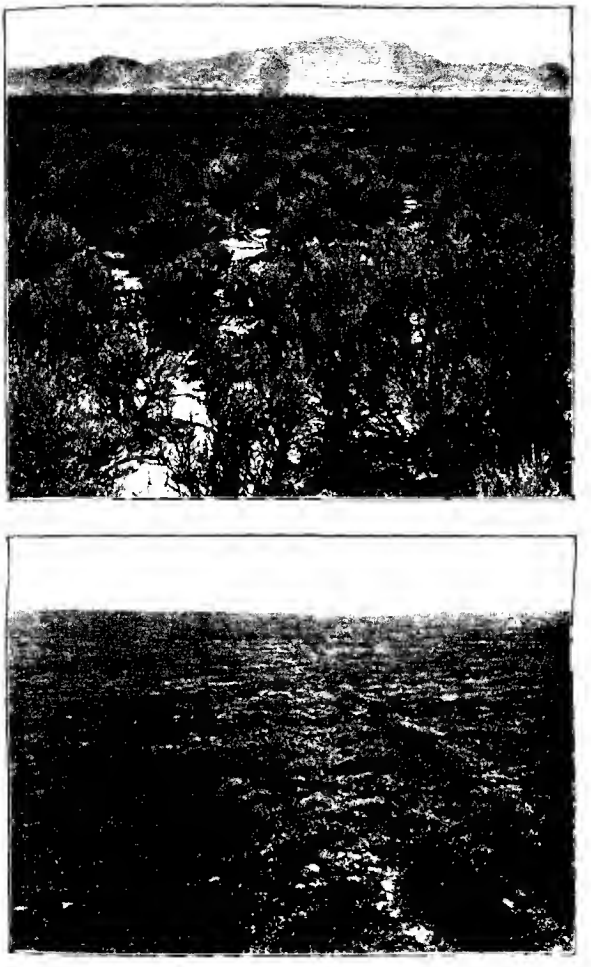


Plate I.—Showing the native sagebush vegetation on virgin land in the intermountain district (above), and the short-grass vegetation of the virgin Great Plains (below). The Intermountain district has a winter rainfall and the Great Plains a summer rainfall. (Photographed by H. L. Shantz.)

Rainfall.

It has become customary to use the average annual rainfall as a measure of the relative value of different areas for dry-farming purposes. Since the water supply is usually the primary limiting factor, the annual rainfall must of course be emphasized. All who are engaged in dry-farming investigations recognise, however, the severe limitations of this classification. The seasonal distribution and the character of the rainfall—whether torrential, or in the form of numerous light showers, or occurring as steady soaking rains—are often more important than the total annual rainfall in determining the productivity of a dry-farming region. The uncertainty of the rainfall should also be considered whenever sufficient statistical evidence is available.

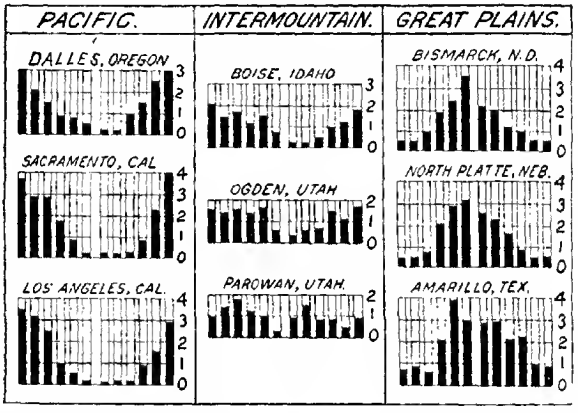


Fig. 1.—Chart showing the monthly distribution of the rainfall at representative stations in the Great Plains, inter-mountain, and Pacific coast regions. The length of the black lines in each diagram represents the monthly precipitation at that place, beginning with January on the left. The scale in inches given on the right of each diagram can be used to find the actual amount of the monthly rainfall. For example, the average monthly rainfall at Bismarck, N. Dakota, for June is seen to be 3½ inches, while for July it is only a little more than 2 inches. It will be noted that in the Pacific coast region the rain comes principally at the beginning and end of the year, that is, in winter; in the inter-mountain districts, during winter and spring months; and in the Great Plains during the summer months.

Rainfall is not the only factor of importance, however. We shall refer later to the desirability of knowing the seasonal evaporation as measured from freely-exposed tanks, which affords a summation of those factors which determine the rate of transpiration. The maximum temperatures and the wind velocity are also important factors. For an adequate comparison of widely-separated dry-farming areas, a knowledge at least of the annual rainfall, its seasonal distribution, the seasonal evaporation, and the depth and character of the soil, appears to be indispensable.

Reference has already been made to the striking difference in the monthly distribution of the rainfall in the Great Plains as compared with the inter-mountain districts. This difference is illustrated in Figure I., which shows the monthly distribution of rainfall at representative stations in each area. Three Pacific slope stations, with a distinctly winter type of rainfall, are also included. In this latter region, owing to the mildness of the climate, an annual crop of wheat is grown during the winter months either for grain or hay.

Grain farming under the alternating fallow and cropping system has been satisfactorily established in Utah, where the annual rainfall is 13 inches or more. In the southern part of the State of Washington, where the conditions are unusually favorable, land with an annual rainfall as low as 10 inches is used for growing winter wheat by the summer-fallow method,* but the returns are uncertain. When the annual rainfall is reduced to 8.5 inches, the crop will barely return the cost of production.

The rainfall required when the rain comes chiefly in the summer is higher than for winter rainfall. This appears to be due to the greater evaporation-loss from the fallow when wet frequently by summer rains. In the Great Plains, where a summer rainfall prevails, dry-farming is not successfully conducted on an annual rainfall less than 14 inches, and this minimum is still higher in the southern part of the area, due, as we shall see, to the higher rate of evaporation.

Evaporation.

The evaporation-rate may fairly be considered as ranking next in importance to the annual rainfall in determining the dry-farming possibilities of a region. The evaporation from a free water surface represents a summation of the intensity of solar radiation, temperature, saturation-deficit, and wind velocity, all of which enter also into the determination of the transpiration-rate of the growing crop, though not necessarily in the same proportion as in free evaporation. Evaporation has been measured daily during the summer months at each of the experimental farms located in the dry-farming sections. Tanks 6 or 8 feet in diameter and 2 feet deep are used, the tanks being sunk in the ground to within 4 inches of the top. The free water surface is maintained at ground level, *i.e.*, about 4 inches from the top of the tank. Observations are now available for seven years at the stations first established. The observations are limited to the six months from April to September inclusive, since freezing weather is encountered at the stations during most of the remaining months. The average seasonal (April to September inclusive) evaporation in inches for each station, together with its location, is shown on the accompanying map (Figure 2). The evaporation increases rapidly as one proceeds southward in the Great Plains: the evaporation in northern Texas, for example, is 54 inches, compared with 31 inches in the central part of North Dakota. Such differences have a profound influence upon the water requirement of plants.

Shantz† has shown that under practically uniform soil conditions a pure short-grass formation is found in northern Texas, with an annual

* Briggs, L. J., and Belz, J. O. Dry-farming in relation to rainfall and evaporation.—United States Department of Agriculture, Bureau of Plant Industry, Bulletin 188, page 25.

† Shantz, H. L. Natural vegetation as an indicator of the capabilities of land for crop production in the Great Plains area.—United States Department of Agriculture, Bureau of Plant Industry, Bulletin 201, page 12.

rainfall of about 21 inches; in eastern Colorado, with an annual rainfall of about 17 inches; and in Montana, with an annual rainfall of approximately 14 inches. The region throughout has a summer rainfall. The same plant formation then requires 50 per cent. more rainfall in northern Texas than in Montana. The explanation of this is to be found in the difference in the evaporation-rate in the two sections. Reference to Figure 2 will show that the evaporation in northern Texas is approximately 60 per cent. higher than in central Montana. A similar comparison between northern Texas and north-eastern Colorado shows that short grass requires about, approximately, 27 per cent. more rainfall in northern Texas, where the evaporation is 23 per cent. higher than in north-eastern Colorado. The effectiveness of rainfall depends, of course, upon its penetration into the soil, so that any relationship

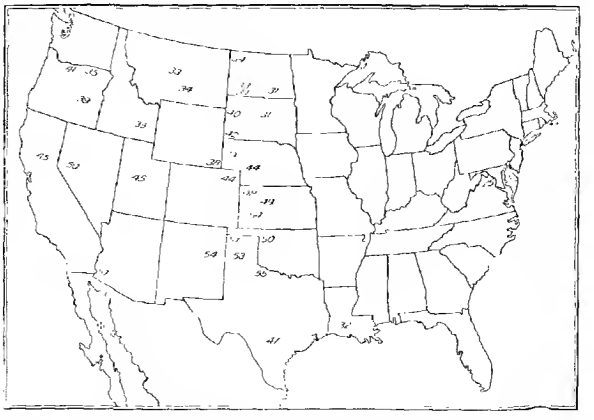


Fig. 2.—Map showing stations at which evaporation measurements are being made by the Office of Biophysical Investigations. The figures show the evaporation in inches during the six summer months (April to September inclusive). It will be seen the evaporation in the southern part of the Great Plains is nearly twice that in the northern part.

which may be developed between evaporation and precipitation will necessarily be an approximate one. The above figures indicate, however, a rather close parallelism between the evaporation and the rainfall required to maintain a given plant formation, and emphasizes the necessity of knowing the evaporation as well as the rainfall in judging the dry-farming possibilities of a region.‡

A direct relationship between evaporation and water requirement, *i.e.*, the pounds of water required by a plant in the production of a pound of dry matter, is shown in the following measurements by Briggs and Shantz of the water requirement of the same strain of alfalfa when grown in different parts of the Great Plains (Table I.).

‡ Briggs, L. J., and Belz, J. O.—Bureau of Plant Industry, Bulletin 188, 1911, page 20.

Table I.—Water Requirement of Grimm Alfalfa (Second Cutting) at Different Stations in the Great Plains, 1912.

Location.	Growth period.	Days.	Water requirements.	Evaporation in inches.	Daily evaporation in inches.	Ratio of water requirements to evaporation daily.
Williston, N.D.	July 29–Sept. 16	47	518 12	7.5	0.159	33
Newell, S.D. ..	Aug. 9–Sept. 24	46	630 8	8.6	0.187	34
Akron, Col. ..	July 26–Sept. 6	42	853 13	9.5	0.226	38
Dalhart, Tex...	July 26–Aug. 31	36	1,005 8	11.0	0.306	34

It will be seen that the water requirement increases steadily as one proceeds southward through the Great Plains, being twice as great in northern Texas as in North Dakota. The daily evaporation also increases in a corresponding manner, so that the ratio of the water requirement to the daily evaporation is approximately constant. Montgomery and Kiesselbach* have shown that maize grown in a dry house and a humid house varied in its water requirements exactly in proportion to the relative evaporation-rates in the two houses.

The water requirement is not, however, always proportional to the evaporation. Other factors, such as temperature, may have a profound influence in determining the development of the plant. This may be illustrated by comparing the water requirement of wheat and sorghum in Colorado and in northern Texas (Table II.).† When the difference in evaporation is considered, sorghum is seen to have made a more efficient use of its water supply in Texas than in Colorado, while the reverse is true in the case of wheat.

Table II.—Comparison of the Relative Evaporation and of the Relative Water Requirement in the Great Plains in 1910 and 1911.

Station.	Year.	Crop.	Growing period.	Evaporation.		Water requirement.	
				Actual.	Relative.	Actual.	Relative.
Akron, Colo...	1910	Wheat..	April 18–Aug. 2	37·7	100	664	100
Amarillo, Tex.	..	..	April 5–July 19	34·0	122	853	128
Akron, Colo...	1910	Sorghum	May 25–Sept. 28	33·0	100	356	100
Amarillo, Tex.	..	..	May 10–Aug. 28	37·7	114	359	101
Akron, Colo...	1911	Wheat..	May 13–Aug. 2	24·8	100	468	100
Dalhart, Tex.	..	..	April 25–July 18	28·5	115	673	143
Akron, Colo...	1911	Sorghum	May 12–Sept. 4	35·0	100	298	100
Dalhart, Tex.	..	..	May 14–Sept. 12	41·9	120	313	105

* Studies in the water requirement of corn.—Nebraska Agricultural Experiment Station Bulletin 128, 1912.

† Briggs, L. J., and Shantz, H. L. Water requirement of Plants. I.—United States Department of Agriculture, Bureau of Plant Industry, Bulletin 284, page 45.

(To be continued.)

BUTTER AND BEEF.

RED POLLED MILKERS.

Government Importations.

The success which has attended the efforts of the Department of Agriculture in building up the high-yielding breed of Red Poll dairy cows now stationed at the State Research Farm, Werribee, has encouraged the Government to augment the locally-bred stock by the introduction of selections from the best herds of England, and six typical representatives of the modern dairy type of the breed are due to arrive by the s.s. *Dorset* during the course of the month.

When Mr. W. A. N. Robertson, Chief Veterinary Officer, was commissioned by the Federal Government to represent the Commonwealth at the International Veterinary Congress in August last, the Director of Agriculture (Dr. S. S. Cameron) suggested that Mr. Robertson

Red Polls in English Meadow.

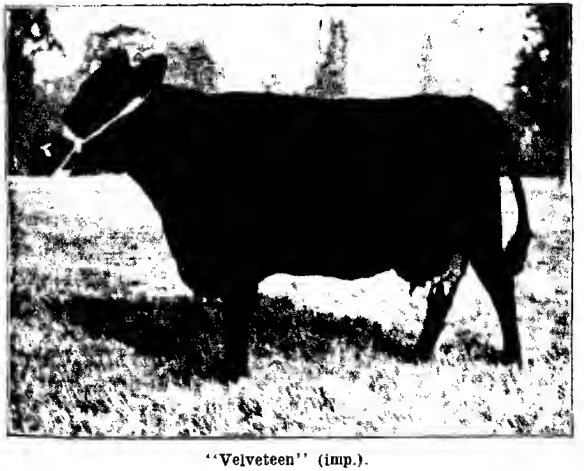
The Hon. the Marchioness of Graham's select Red Poll milkers.
Herd average, 1913, 6,443 lbs.

should be intrusted with the selection and purchase of the best specimens of the dairy type of Red Polls obtainable in England. Financial provision was obtained. It was known that the Red Poll Herd Book Association of Great Britain had for upwards of twenty years been paying the utmost attention to the development of the dairying characteristics of the breed, which had previously depended for its popularity on three very desirable characteristics, viz., hornlessness, soundness, and hardiness of colour and constitution and quick fattening.

Their efforts in this direction have been such that the development of a dual purpose breed is no longer a matter of speculation, but a definitely proven fact attested by the magnificent dairying results shown in the Association's Herd Test and published from year to year in the Herd Book, along with the annual prize records in fat stock and beef classes at Smithfield, the Royal, and other English shows.

Mr. Robertson returned to Melbourne last week, and from particulars furnished it would appear that he has succeeded in his mission almost beyond expectation. It will be a surprise to most Australian

"Primrose League" (imp.).



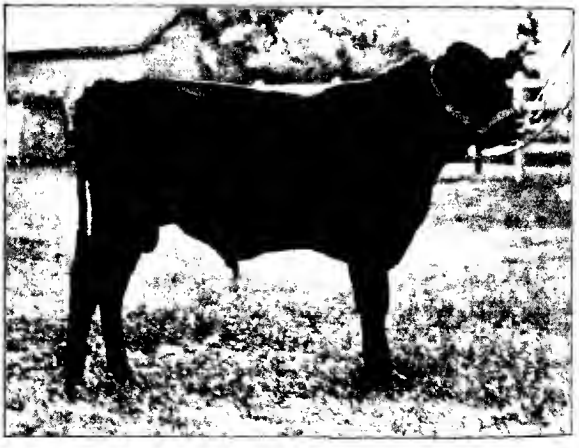
"Velveteen" (imp.).

dairymen, who usually confine themselves to the Ayrshire, Jersey, and Shorthorn breeds of dairy cattle, to learn that the Red Poll in England puts up records for milk yield fully equal to those of the more popular

dairying breeds just mentioned; but the milk records of the ancestors back to the seventh generation of some of the animals Mr. Robertson has succeeded in purchasing leave no room for doubt.

"Longford Major" (imp.) 2 years old.

Imported by the Department of Agriculture, Victoria. Dam's record, 1,471 gallons; average over 6 years, 1,138 gallons.



"Belligerent" (imp.) yearling.

Imported by the Department of Agriculture, Victoria. (The milk records of nine of the female ancestors of this young bull average over 1,000 gallons of milk per annum, extending over from 2 to 12 lactation periods—average of seven years.) (See table in text.)

For wealth of milking pedigree, first mention should be made of the young bull "Belligerent," the second calf of a dam "Meadow Rubicon," which yielded 7,144 lbs. (714 gallons) on her first milking, and whose dam in turn has a record for one lactation period of 14,533 lbs. (1,453 gallons), and a continuous average for her first four calvings of 12,871 lbs. (1,287 gallons). This cow, "Flaxmore Ruby," had calved a couple of *months before Mr. Robertson's inspection*, and she was then yielding 72 lbs. (7 1-5 gallons) a day, and bidding fair to surpass her previous best record. Being a comparatively young, fresh cow, an attempt was made to buy her; but no offer within reason would tempt the owner, and Mr. Robertson had to be satisfied when his persuasive efforts enabled him to get hold of her grandson.

On the sire's side, Belligerent's pedigree is even stronger in milking forbears, as will be seen from the following tabulation of records for seven generations back:—

——	Milk Record.	Annual Average.	Years Recorded.
Belligerent.	lb.	lb.	
Dam, Meadow Rubicon	7,144	(1st calf)	
G.-dam, Flaxmoor Ruby	14,533	12,871	4
Sire's dam, Meadow Blush 3rd	10,370	9,354	7
Sire's g.-dam, Meadow Blush 2nd ..	9,510	8,033	12
G.-sire's dam, Kitchener	7,024	(1st calf)	
G.-sire's g.-dam, Kitchener's Daffodil ..	10,215	9,386	7
G.-sire's g.g.-dam, Daffodil	10,176	8,827	5
G.g.-sire's dam, Berry	12,565	8,853	10
G.g.g.-sire's g.-dam Ripe Pear	10,008	9,754	2
Average milk record of 9 ancestors ..	10,161	9,708½	7

Rack feeding of hornless milkers (Werribee Research Farm).

Belligerents apparently must have allies nowadays, and there comes with the yearling a two-year-old "Longford Major," which Mr. Robertson purchased from the Marchioness of Graham, who bought him from the Earl of Radnor on the day he was calved, on account of his dam's

milking fame. This bull is equally likely to intensify the dairying characteristics of the Government herd. His dam, Mona, is the crack cow of the Longford Castle herd, and has a lactation record of 14,713 lbs. (1,471 gallons), with an average over six consecutive years of 11,388 lbs. (1,138 gallons), while on her last calf she averaged 36 lbs. (3 3-5 gallons) of milk daily for 361 days. Longford Major's granddam, Minnie, has a lactation record of 10,548 lbs. (1,054 gallons), and a four years' average of 9,135 lbs. (913 gallons).

As indicated in the attempt to buy Flaxmoor Ruby, the present stars among the Red Poll milkers in England were very firmly held, and Mr. Robertson had to be satisfied for his females with cows of authoritatively recorded milking descent, but which themselves had not reached their prime as milkers. His instructions were to take nothing on chance; so many promising heifers were passed by, and only cows doing their second and third lactation periods, whose actual milking capacity could be personally checked, were selected.

The cows to arrive are:—

	Milk Record.	Annual Average.	Years Recorded.
	lb.	lb.	
1.—Primrose League..	5,035 (1st calf)		
Dam: Primrose	8,179	7,826	3
G.-sire's g.-dam: Ripe Pear ..	10,088	9,754	2
2.—Velveteen	6,475 (1st calf)		
Dam: Fustian 2nd	8,336	7,387	3

Dr. Cameron is pleased with the way in which Mr. Robertson has carried out his mission, and is more certain than ever that the Red Poll breed will quickly challenge the other dairying breeds for supremacy. Dr. Cameron, when Chief Veterinary Officer, was responsible for the establishment of the Red Polls under Government management, and he still exercises direct personal control of the breeding operations at the State Research Farm at Werribee. He was thought to have taken a considerable risk in departing from the beaten track as regards the variety of cattle chosen to establish the first Government dairy herd, from which milk record-bred bulls were to be distributed, but the practical advantage of the hornless prepotency of the Red Polls appealed to him, and his confidence in the milking potentiality of the breed has been amply justified. In competition under standard herd test conditions with the leading herds of other breeds in the State, the Red Polls last year occupied fifth place among heifers, seventh and ninth places in the four-year-old division, and twenty-third place in the class for aged cows of all breeds.

Dr. Cameron points out that when the new importations are mated with the present herd the progeny will probably have a more extensive milking record pedigree than any other breed or herd in the State, for the milk yield of every cow in the Government herd has been recorded daily and published annually for the past five years, while it is unlikely that any other herd can show progeny from cows so recorded and sired by bulls whose female ancestors have recorded and published yields for seven generations.—Reprinted from *Weekly Times*.

PRUNING THE OHANEZ AND SOME OTHER "SHY BEARING" VINES.

By F. de Castella, Government Viticulturist.

Owing to the remarkable keeping quality of its fruit under cool storage conditions, which makes it the most reliable shipping grape, the Ohanez vine is attracting much attention at the hands of intending vine growers, especially in our northern irrigation districts, where the growing of grapes for export in the fresh state appears to be a coming viticultural industry of very great promise.

This vine seems to require special treatment in the way of pruning if satisfactory yields are to be expected from it. It is true that our practical experience of this variety, on anything like a large scale, is as yet very limited; nevertheless a certain amount of information has already been collected in connexion with the manner in which it produces its fruit, the logical outcome of which is the system of pruning about to be described, a system which differs very considerably from that at present applied to any vine we now cultivate.

The Ohanez vine has long had the reputation of being a shy bearer. Several Victorian growers who have for many years cultivated a few vines of this variety under the incorrect name of Almeria* complained of its poor yield. In Spain it is held to need artificial pollination, either with pollen from another variety or even with that of its own flowers.† According to recent experience in this State, the cause of the small yield does not appear to be faulty constitution of the flower so much as an insufficient production of flower buds. Those which do make their appearance in spring usually set quite normally, furnishing well filled bunches: it is the number of these, however, which is insufficient.

Scanty yield in a vine may arise in several different ways; there may be an abundant "show" of fruit in the early spring—in other words a very free production of the green, somewhat cauliflower-like processes, which constitute the embryo bunches and which usually come into flower in early November. Failure to "set" the fruit, or *coulure*, as it is termed in French, may result in little or no fruit remaining on the vine at vintage time. This may happen in different ways. There may be more or less complete dropping off of the flower buds before blossoming time. In other cases the flowers blossom in most promising fashion, yet fail to set or only set the fruit very incompletely. In other cases, again, the flowers appear to set satisfactorily, but the berries drop off to a greater or lesser extent when they have attained the size of small shot. The first of these visitations is mainly climate—it was only too common during the disastrous spring of 1914; some varieties (Malbeck, Clairette, &c.) are more prone to it than others. The second is often due to faulty pollen, and may be corrected by interpollination:

* Almeria is the name of the Spanish town whence grapes of the Ohanez variety are so largely shipped. To use the name of this town to describe Victorian grapes is contrary to international law, and dangerous as well as illogical. It would constitute a misuse of a "regional appellation," and, as such, be contrary to the provisions of the Washington Convention of 1911, to which Great Britain is one of the contracting States. Grapes offered for sale in England under the name of Almeria would, therefore, be liable to seizure and confiscation. To avoid such risk the name Ohanez should be used.

† See *Journal* for September, 1908, p. 549.

Raisin des Dames or Bicane and several other table grapes suffer in this way. The third usually responds to the cincturing which is so extensively applied to combat it in the case of the Zante currant. Late pruning, stopping (or nipping), interpollination, sulphuring and cincturing are, in fact, the standard treatments recommended for vines which set their fruit in an unsatisfactory manner.

The shy bearing of the Ohanez is of a quite different order. When pruned in the ordinary way it fails to produce flower buds, or at least forms very few of them: in other words, the show of fruit is unsatisfactory. In such a case it is evident that no spring or early summer treatment can lead to an increase of crop; it is at the winter pruning that steps must be taken to guard against the trouble. The case is similar, though not entirely so, to that of a vine requiring long pruning. If such a vine—a Sultana for example—be pruned short the show of fruit will be insignificant, and no summer pruning operation can cause it to yield grapes in the autumn. As all practical vine pruners know well,

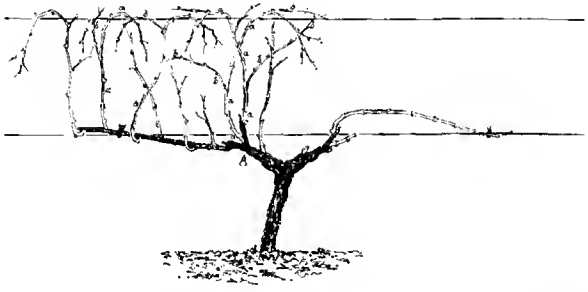


Fig. 1.—Ordinary long pruning with two rods, known as the double "Guyot" system. The right-hand side of this vine has been pruned, the left hand side has not. The growth of the previous year's spur at A will furnish rod and spur as on the right-hand side.

the canes of varieties which demand long pruning have their fruitful eyes situated at some distance from their base. If such a vine be spur pruned the only eyes left on it are the more or less barren ones near the base of the canes, hence the failure to produce crop.

With Ohanez, even the long pruning, which extracts such abundant crops from the Sultana, is not sufficient to ensure a satisfactory yield, for the reason that the most fruitful buds are not situated on any part of the main or primary canes, but on the lateral canes which grow off them. In order to obtain abundant fruit it is not only necessary to prune the Ohanez long, in other words to rod prune it, but *the rods on which the fruit will be borne should consist of lateral growth.*

In order to render this clear to beginners it may be well to further explain with the aid of a few diagrams. Fig. 1 represents a vine pruned long, according to the ordinary method with two rods, usually known as double "Guyot" pruning—what is usually termed in South Australia the Bordelais Spalier. In the vine here represented the right

half has been pruned whilst the left half has not. The cuts required in order to prune the left hand side of this vine are evident at a glance. The previous year's rod, together with the canes which have sprung from

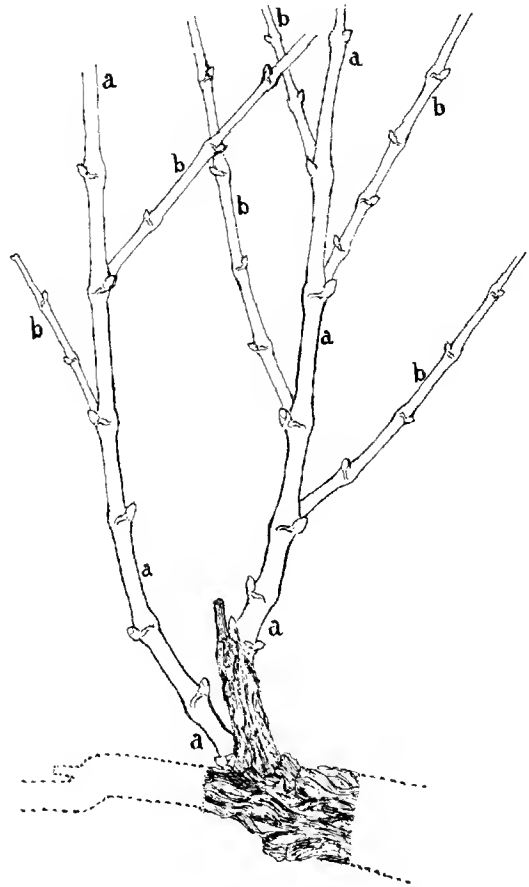


Fig. 2.—Growth of spur at *A*, Fig. 1, as it would be in the case of a vine variety which produces laterals freely. *a*, *a*, *a*, are main canes; *b*, *b*, *b*, are laterals.

it, will be entirely removed, the previous year's spur (situated at the apex of the letter A), furnishing the new spur and the new rod. In this case the rods are chosen from main canes such as *a*, *a*, any lateral

growths which may be situated on them being entirely removed. In the case of Ohanez, however, it is these very laterals which we shall use to constitute our new rods.

What is a Lateral?

Though the definition may be needless to an experienced pruner, it may here be explained that a lateral is a cane growing off a main or primary cane during the same season. A lateral is thus of the same age as the cane off which it grows. The green or herbaceous vine shoot sent out from a previous year's bud has its leaves situated alternately on opposite sides of the cane. In the axil of each leaf there is a large bud which remains dormant during the growing season, but which will produce a new primary cane the following year. In addition to this large bud, there are several less noticeable ones. Two or three of these are latent buds, which only develop the following season in case of damage to the main bud. It is these which provide the secondary growth, often bearing some fruit, in cases where the shoot from the main bud has been destroyed by frost. All these, however, are buds which only develop during the season following their formation. In the axil of each leaf there is another bud which usually develops a season earlier, that is to say during the season of its formation. The canes issuing from these buds are laterals, and it is on them that are to be found, in the case of the Ohanez vine, the really fruitful buds.

Referring again to Fig. 1, the spur at the apex of the letter A will be seen to have sent out two main canes, *a*, *a*, *a*, *a*, each of which has in turn thrown laterals *b*, *b*, *b*. The production of laterals in this case is not considerable: it usually happens that they are much more numerous. The spur shown in Fig. 1 may, for example, grow as in Fig. 2, in which the canes marked *a*, *a* are main canes and those marked *b*, *b* are laterals. Certain vine varieties produce laterals freely; Ohanez, in fact, belongs to this type. As will be explained presently the formation of laterals can also be stimulated by a simple method of summer pruning.

Lateral Rods.

In the case of abundant lateral production such as is shown in Fig. 2, there is no difficulty about pruning to lateral rods. Fig. 3 shows a vine thus pruned. The right hand side of this vine bears the rod *a*, *c*, and the spur *s*. The rod is a composite one: the portion *a*, *b* being main cane and the portion *b*, *c*, lateral growth. It is important to remember that the whole of this rod is of the same year's growth: the portion *a*, *b* is not, as might at first sight be thought, a season older than the lateral part *b*, *c*.

Lateral canes are necessarily weaker than main ones; they may occasionally be rather too weak for a single one to serve for a rod. In such a case two laterals may be brought down to do the duty of one stronger one, as shown on the left hand side of Fig. 3. The rods are, after all, only annual expedients for fruit production; they do not form part of the permanent framework of the vine, but will be entirely removed at the following pruning.

Fig. 4 will give some idea of the fruit production of the right hand half of Fig. 3. It will be seen that whilst the buds of the lateral portion of the rod *i*, *g*, *h*, *k*, *l*, *m*, *n*, have produced numerous embryo bunches, scarcely any are to be seen on the shoots sent out from the buds *a*, *b*, *c*, *d*, *e*, or from those on the spur, *s* and *r*.

Provision for Laterals.

The Ohanez vine usually produces laterals freely; more so than most other table grapes. This is, in fact, the main reason why this variety suffers less than many others from sunburn. Its fruit is well protected

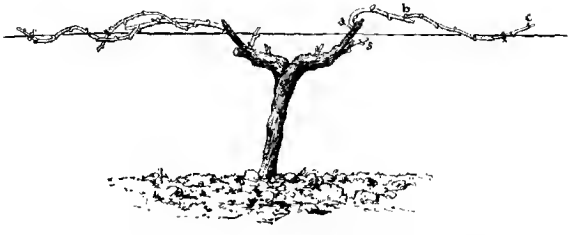


Fig. 3.—Long-pruned vine with rods consisting mainly of laterals. The portion *a*, *b* is main cane, whilst *b*, *c* is a lateral.

by the abundant lateral growth. By the judicious application of a little summer pruning it is easy to provide all the laterals which may be required at the following winter pruning. The suppression of the terminal

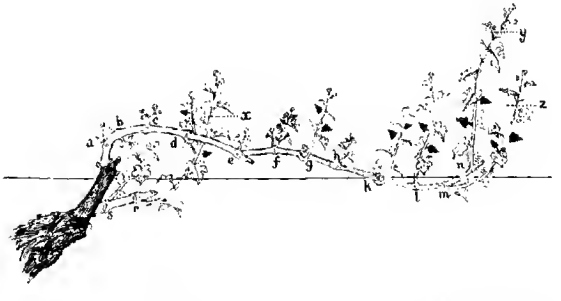


Fig. 4.—Summer pruning to supply lateral growths by "stopping" shoot *r* at *x*. The stopping of shoots *m* and *n* at *z* and *y* is also recommended. It improves the fruit and tends to equalize growth in shoots nearer the vine—*b*, *d*, *f*, *g*, *h*, *k*, and *l*. Shoots *a*, *e*, and *c*, which bear no fruit, have been removed or "disbudded."

bud of a growing cane has a remarkable effect on its further development. The first effect of the check is to throw the growth back to buds situated nearer to the main stem of the vine. After a while, growth is resumed by the stopped cane, in the shape of the development of laterals.

Referring again to Fig. 4. The spur will be seen to have given rise to the shoots *r* and *s*. These will provide the rod and spur required for the following year's pruning. By suppressing the terminal portion of the shoot *r*, as shown in Fig. 4, we can bring about the production of

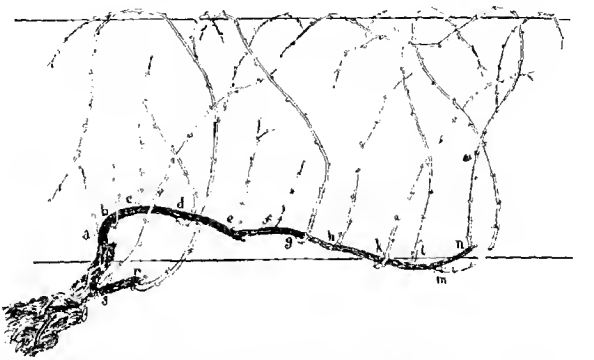


Fig. 5.—Growth resulting from Fig. 1 at the end of the season—as it would be if no summer pruning had been practised.

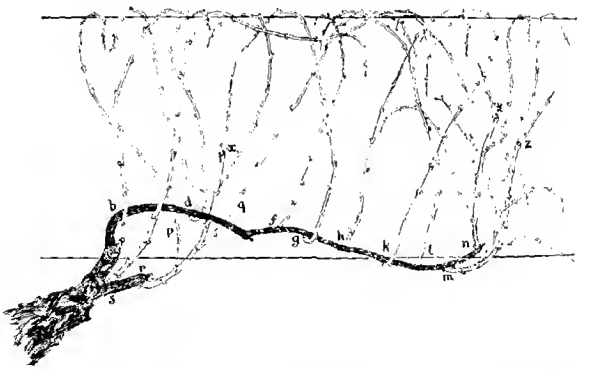


Fig. 6.—Growth resulting from Fig. 1, showing the marked effects of summer pruning. The stopping of shoot *r* at *x* has caused it to throw strong laterals, of which *p* and *q*, or both of them, may be used as lateral rods. Stopping *m* and *n* has caused them to produce laterals, and has strengthened the growths of *b*, *d*, *f*, *g*, *h*, *k*, and *l*.

several lateral canes for winter pruning. Fig. 5 shows the growth resulting from Fig. 4 if it were left untouched. Fig. 6 shows the effect of a little summer pruning applied to the same vine. It will be observed that in Fig. 5 the cane *r* has not produced laterals to any extent, whereas

in Fig. 6 the suppression of the growing tip at *x* (Fig. 4) has resulted in the growth of strong lateral shoots, either *p* or *q* of which may be utilized to form the new lateral rod.

The stopping of shoot *r* (Fig. 4) has also resulted in shoot *s* growing more vigorously, and therefore supplying a better spur for the subsequent pruning.

The suppression of the tips of the shoots from *m* and *n* (at *y* and *z*, Fig. 4) will be seen to have modified their growth in a similar manner (compare Figs. 5 and 6). Though such treatment is not applied with the object of providing laterals for pruning, it is strongly to be recommended, and will amply repay the trifling amount of labour entailed. If stopped at *y* and *z* (Fig. 4) not only will the fruit borne by these canes be improved, but the growth will be thrown back into *b*, *d*, *f*, *g*, *h*, and *k*, which will be seen to be more developed in Fig. 6 than in Fig. 5. Disbudding may advantageously be combined with the operation of "stopping"; any shoots not required for pruning—such as for example as *a*, *c* and *e* (Fig. 4)—being rubbed off.

Increasing the Number of Rods.

In the above description, in order to simplify matters, a vine pruned to only two rods has been considered. It is evident that if the number of rods be increased, as may sometimes be found desirable with very vigorous, irrigated vines, the same rules would still apply. In the "Double Guyot" pruning shown in Fig. 1, we have a long pruned vine with what Professor Bioletti would call two "units of long pruning"—one on each side. If a greater number of rods are needed, the units would be multiplied, as is so usual with the Sultana, but the rods would, of course, be laterals instead of main canes.

It must be remembered that for export, a berry of large size is required, whereas size is of little or no importance in the case of the Sultana. Large berries are most easily obtained by a judicious reduction of the number of bunches borne by the vine, hence the multiplication of rods, beyond a certain point, is most undesirable.

Pruning to two rods (as in Fig. 3) will usually permit, if the vines are not planted too far apart, a profitable yield of good sized grapes. Should the vigour of the vine warrant it, however, it will be an easy matter to provide an additional rod, or even two of them.

As regards distance apart, 10 feet x 7 feet (or perhaps 10 feet x 8 feet) will probably be found most suitable: 10 feet is a convenient distance between the rows, whilst if further than 8 feet apart in the rows the number of rods would probably require increasing, with the accompanying risk of reduced size of berry.

Origin of the Method.

It may be of interest to state here that for the suggestion which led to the trial of the method in Victoria the writer is indebted to M. Alexandre Tacussel, whose magnificent collection of table grapes at Vaucluse (France) he visited in 1907.

M. Tacussel expressed his intention of causing fruit production in a vine imported from Asia Minor, which had as yet borne no fruit, by pruning to a lateral rod. He also quoted the advice given to him by M. Eckerlin, Inspector of Agriculture in the Ottoman Empire, in connexion with the pruning of the Sultanieh (same as our Sultana), that

"to obtain fine fruit it is necessary to prune to a lateral cane, the sprouting of which has been brought about by stopping the primary shoot." This advice was communicated to Mr. R. G. Cameron, of Merbein, who tried it in 1913 with most satisfactory results: so much so that he has now adopted it as a regular pruning method.

The fruitfulness of laterals receives further confirmation in a recent article by Professor Ravaz, of Montpellier (France)*, dealing with the forming of young vines. He points out how, in the case of a vigorous, strongly-grown field graft, one may form the vine the first year, selecting strong laterals for the spurs. "There is no objection," he says, "to the use of these laterals (*contre boutons* or *entre cours* in French). They are even said to be more fruitful than the canes which bear them. Many varieties of foreign vines scarcely produce grapes except on these." Evidently Ohanez was one of the vines Professor Ravaz had in mind.

* * * * * * *

Such is the method of pruning which is now confidently recommended to planters of the Ohanez vine. Further experience is no doubt desirable, and will be forthcoming in due course.† The results *already* obtained however, notably by Mr. Cameron, are so encouraging that it would be unfair to withhold it from the vine-growing public pending further trial.

It is probable that other varieties, besides Ohanez, may with advantage be treated in similar manner—the Palomino of Jerez, for example, so long known to us under the name of Sweetwater—in fact all varieties which, like it, do not show much fruit in early spring.

* *Progres Agricole*, 14th Feb., 1915.

† The thinner extremities of very long canes may, in the same way as laterals, prove more fruitful than the first couple of feet, which are stouter. Such a peculiarity may possibly be responsible for the *Parra* system of training so generally practised in Almeria (see *Journal of Agriculture* for September, 1908, p. 550). These much developed overhead trellises certainly lend themselves to pruning to very long rods.

SULPHUR AND PYRITES AS FERTILISERS.

New experiments on the possible fertilising action of sulphur are reported from France.

Nitrogen, as nitrate of soda, and nitrogen, as dried blood, was applied with and without admixture with sulphur.

The increased returns from the nitric nitrogen plots, *i.e.*, where the nitrate of soda was used were practically nil, but in the case of organic nitrogen, viz., blood, the returns from the sulphur plots showed an increase of 30 per cent. with wheat, and 60 per cent. in the case of beans.

These returns appear to confirm those of Boullanger and Dujardin, who found that sulphur exerts little or no action without organic nitrogen, but acts energetically in the presence of organic matter.

Sulphur pyrites acted in the same manner as sulphur, giving a 40 per cent. increase in the yield of wheat, and 50 per cent. in the yield of beans.

Extract from "Fertilisers."

7th March, 1914.

Sulphur in its elemental form was not tried in the nitrification tests conducted by Dr. Paterson and Mr. R. Rankin Scott, lately reported in this *Journal*.

THE WALNUT.

(Continued from page 439.)

C. F. Cole, Orchard Supervisor.

PLANTING.

The land having been specially prepared, and the rows marked off 4 feet apart, place the planting line in position, and open out a grip or drill about 3 to 4 inches in depth. A plough may be used for opening out the grip if planting is upon a large scale. Carefully place the nuts in the grip, and see that the root-sprout is placed pointing straight downwards. A little soil will hold the nut in position. Care must be exercised when planting that the short sprout is not injured through rough handling or downward pressure into the soil. Place the nuts not less than 9 inches apart in the planting row, and cover them with not more nor less than 3 inches of soil; sand is a valuable covering if easily procurable. If planting should be delayed, and many of the nuts have made long sprouts, it will be necessary to use a trowel or other suitable tool for deepening the grip or drill. Planting long-sprouted nuts or those commencing to send up a stem requires care. If the sprouting stem is broken in any way, it should be discarded. Injury to the root-sprout, if not too close to the nut, is not serious. When planting from the germinating bed, it is an advantage to carefully cut the root-sprout (embryo tap root) to within a few inches of the nut, thus encouraging a lateral root system. It is not wise to allow a tap-root to be unchecked, and reduced back later when planting out permanently in the grove. To perform this operation, it is necessary to allow the nuts a longer period in the germinating bed to develop a long root-sprout. The advantage of checking the developing tap-root (apart from encouraging a lateral root system) is that, if the check to the tap-root is going to develop injury through cutting, it is brought about in the nursery row, and not after planting in the young grove.

The writer favours a branching root system, encouraged from the early stages of growth, instead of reducing the tap-root when planting out permanently from the nursery row.

Plate 32 depicts two types of English seedling walnuts removed from the nursery row in late spring, the nuts being planted from the germinating bed. Fig. A is developing an uninterrupted tap-root, whilst Fig. B is developing a spreading root system, which has been brought about by having the root-sprout checked by injury when planting out from the germinating bed. The practice of planting the nuts of the English seedling varieties or other species of walnuts direct in drills in the nursery row before germinating them firstly in a bed has nothing to recommend it. Nuts that do not germinate freely or show a weakly tendency should be discarded.

It will be found that many of the nuts, if planted direct in the nursery row, will not germinate through various reasons. Time and space is wasted by growing those of a weakly tendency. Besides, the risk of producing seedlings developing a crooked or undesirable tap-root is greater than when germinating the nuts before planting. Many

argue that the small percentage of crooked tap-roots can be largely decreased, when planting the nuts direct in the drills, by the position in which the nuts are placed. The nuts of the seedlings depicted in Plate 33 were planted direct with the sharp end pointing upwards, the

Plate 32.—English seedling Walnuts.
A—developing uninterrupted tap roots; B—branching root system.

root-sprouts emerging from the sharp end. The downward course of the developing tap-roots over the rounded surface of the nuts into the soil is responsible for this particular shape. Compare these two examples with Fig. B, Plate 32, showing that the root sprouts emerged from the

nut at the blunt or stalk end. The position of the nuts lying in the bed before sprouting being dissimilar, the upward growing sprout (stem of the future tree) passed through the nut, and emerged at the sharp end. From these examples, it is obvious that the root-sprout of the walnut, when emerging, does not confine itself to any particular point,

Plate 33.—English seedling Walnuts developing crooked taproots.

although usually emerging from or about the sharp end of the nut. The common practice, when planting the nuts direct in the drills, is to place them upon the flat (see Fig. A, Plate 32), or with the pointed end downwards.

PLANTING NUTS IN ORCHARD FORM.

The practice of planting nuts in orchard form in the places where the trees are to remain permanently is not largely practised in Victoria, and it is only carried out by those desirous of growing a few trees, mostly for ornamental purposes.

This custom has nothing to recommend it. Apart from growing trees of non-selected types and varieties, which will eventually produce nuts of inferior quality, many of the young seedling trees will be found constitutionally weak, and not of a thrifty nature. This latter condition can be somewhat remedied by germinating the selected nuts before planting, and only selecting those nuts that sprout quickly and show a freedom of growth. Even if six or more nuts are planted in each individual place, it is not a guarantee that any one of the six nuts will produce a tree of rapid growth and of a thrifty nature. Upon the other hand, the whole six nuts may produce suitable trees, five having to be pulled out, leaving the strongest to remain permanently. Again, there is the risk that the nuts, through some reason or other, may not germinate, and may require to be re-planted the following year. The seedlings may get broken or partially injured, or, through unfavorable weather conditions, may not receive the attention they require. Eventually a grove is developed containing trees of different ages and great variations in size, and this becomes more pronounced every year. There is no necessity, and nothing is gained by planting a grove of English walnuts upon this method. Those who have already practised or uphold this method of planting a grove should ground-graft, or work over the seedling trees with selected and suitable varieties to the locality. It has already been pointed out in these articles that walnuts generally do not come true to the parent type; propagation by grafting or budding is therefore, necessary to perpetuate a selected or choice variety.

PLANTING BLACK WALNUTS IN ORCHARD FORM.

Respecting the planting of nuts of the Black walnuts in orchard form, a diversity of opinion exists among growers. From the results of experiments carried out in California upon practical lines is embodied the following extract from *Bulletin No.* 231, Berkley, California:—

"A few years ago a very popular idea prevailed, especially in the northern part of the State, that the only proper way to plant a walnut orchard was to start black walnut seedlings directly from the nut in the spots which the trees were to occupy in the orchard, so that these seedlings could be grafted to the desired variety of the English walnut later on without ever disturbing the tap-root by digging and transplanting." After pointing out and quoting objections to this method, the author of *Bulletin No.* 231 sums up this nut planting as follows:—"Thus the whole tendency of this method in practice is to produce a most irregular, uneven orchard, which, at the same time, requires several more years for its development than is necessary under other methods. More than all this, the absolute fallacy of the notion that there is any disadvantage in cutting the tap-root or in transplanting the walnut tree has been abundantly established, so that the only object of using this method loses completely its value."

The following is part of a letter received by the writer upon the same subject:—

"*Re* Californian black walnut (*Juglans Californica*), these trees are grown alongside the roads in California, and grow to be large trees, 2 or more feet in diameter, providing they are not transplanted. I have paid considerable attention to the effect of transplanted walnuts, and have yet to see it succeed in a permanent manner. It is only nurserymen that maintain they can be transplanted; no close observer tries to do so."

The very fact that the trees in established groves in California were originally transplanted from the nursery row, such trees continuing to remain thrifty and productive, goes to prove that black walnuts rootstocks can be transplanted successfully.

Failure following the removal of the English seedlings from the nursery row in Victoria is more attributable to root injury when lifting, unsuitable soil, and climatic conditions, or neglect, than transplanting.

PLANTING BLACK WALNUT SEEDLINGS IN ORCHARD FORM.

This method of planting selected seedlings in orchard form, with the idea of grafting them later on, is practised and recommended under certain conditions in California. The advantages claimed are that seedling trees can be grafted over, about 5 feet from the ground, thus obtaining a black walnut trunk, which, with its rough bark, will be more immune to sunburn than the trunk of the English variety. In a grove which is to be grown without irrigation, the grafts upon a well-established black walnut tree will be much better nourished, and receive a better supply of moisture during the first year or two than a transplanted tree, which will be using up its energies in developing new roots. Thus the high-grafted tree will obtain a better start. The objection by some to this method is that top-grafting will probably extend over three years before all the trees bear a good top, an irregular and uneven lot of trees resulting in the grove. Another objection is that this high-grafting on trees several years old develops rapid growing shoots from the grafts, which become top heavy, easily blown over by the wind, and a source of difficulty to keep up in shape until they are able to support themselves. The tendency now is to graft low down upon the black seedlings, within 2 feet of the ground, even though the advantage of the black walnut trunk is thereby lost. After considering the different methods as practised in America, the conclusion arrived at is that if the grove is to be planted in good soil under irrigated conditions, or where there is a sufficient supply of soil moisture, the method of planting nursery-grafted trees is a decided advantage over other methods.

(*To be continued.*)

THE MAIZE-PRODUCING INDUSTRY IN VICTORIA.

By Temple A. J. Smith, Chief Field Officer.

(Continued from page 374.)

SELECTING SEED (*continued*).

The angle of the ear, as the ripening period approaches, should be drooping; an erect ear is seldom a good one, and the fact that it is erect enables it to take in moisture, which causes disease and mildew. It sometimes happens that a thick, strong shank supports an erect ear,

James Yellow Dent variety maize grown on Mr. H. James's Farm, Orbost.

and shanks of this description should be avoided in selection. The average shank should be about three-quarters of an inch in diameter, but no definite rule can be laid down in this respect, as under special circumstances, such as extremely rich soil, a larger shank will give the drooping angle.

The husk should not be too coarse and plentiful, or too scanty to cover the cob—a happy medium is the desideratum here. The tips and butts of all selected cobs should be well filled. The tip not too tapering or too blunt. In some cases, the tip is larger than the butt; this is a wrong state of affairs, and such cobs should be rejected. The butts should be well rounded, and the misshapen grains not too far back in the cob.

Colour.—Fashion appears to govern the market in regard to colour, the present demand being for a well-shaped sample with a golden-yellow colour and a tinge of red. There is no good reason given why one colour should be better than another. In Ohio, United States of America, Silver Mine, a white maize, held preference. The nutritive value in yellow and white maize is practically the same. The protein content is said to be slightly higher in the coloured maize, but as a set-off the fat is higher in the white; still, the market requirements must be the objective, and unless a white variety suits better than a coloured one the place in which it is grown, the colour the consumer prefers should be chosen. There are still further ways in which by selection the maize crop can be improved, the most noticeable of which is improvement of nutritive values in the development of the protein and oil contents.

Cornplanter variety maize grown on Mr. W. Warren's Farm, Orbost.

The Illinois Experiment Station carried out experiments on these lines in the years 1896 to 1908 inclusive. Starting with the same maize the protein was gradually raised from 10.92 per cent. in 1896 to 15.03 per cent. in 1904, the amount varying in the different years, while on the reverse experiment the protein extent was lowered from 10.92 per cent. in 1896 to 7.32 per cent. in 1907, thus showing the effect of selection for protein alone. In a similar test for oil the difference was equally noticeable, as, starting with an oil content of 4.70 per cent. in 1896, the highest point reached was 7.19 per cent in 1908, and the lowest 2.39 per cent., a variation of 4.80 per cent as the result of the experiment.

Selection for protein and oil, however, is somewhat outside the ordinary growers' province, and is only quoted to show how far-reaching the methods of selection may be for general improvement.

Such a system as has been here outlined can be commenced in a small way, and easily proved. Special plots in a corner protected from wind and other disabilities should be laid out, and all results carefully recorded in a book kept for the purpose. The selected ears from the plots should make the seed for the next year's experiment, the bulk of the remaining ears being used for the main crop, and so on in future years. Maize lends itself specially to improvements in the manner suggested, the amount of seed required per acre is small—fifteen to twenty ears will sow an acre—and each ear can be easily examined for selection, labelled, and followed throughout. The use of, say, six varieties in each new district on small experimental plots to prove the most desirable, followed by a good system of selection, must in a very few years greatly improve yields and profits. The infusion of fresh blood

Fig. 1.—Preliminary Test.

of the same variety is advisable from time to time, as constant selection from the same plants appears after a certain period in some cases to affect the yield detrimentally.

Preparing and Testing the Seed.

Every cob used for seed should have the grain on the tips and butts rubbed off until all badly-shaped seed has been eliminated. The cob should be well examined to see that no rot, disease, or mildew has made its appearance. Maize that has dried too slowly, or has been heavily frosted, is liable to kill the germ in the kernel, and much loss may ensue on this account. Quick drying is essential for seed and early-picked ears, for if left in the heap for a few hours mould is liable to occur and cause trouble. A thick wedge-shaped kernel with the

germ well developed at the tip is what is required, badly-shaped grains, shallow and pointed with poor germs lead to loss of vitality and ultimately poor crops. Properly speaking, all seed ears should be

Fig. 2.—Ear germination test (Enough corn is seen on the shelves to plant 40 acres).

Fig. 3.—Placing the grains in the Germination Box.

tested, though little is done in this direction as a rule. The following system, given by E. G. Montgomery and C. W. Pugsley, Bulletin No. 32, Lincoln-Nebraska Experiment Station, is of value as a guide:—

"Testing every seed ear will cost from 2½d. to 5d. per acre, and may mean 5 to 10 bushels increased yield. First make a preliminary test of your seed (Fig. 1). Select 100 ears at random. Take three grains from each ear, each grain from a different part, place 300 grains in a ger-

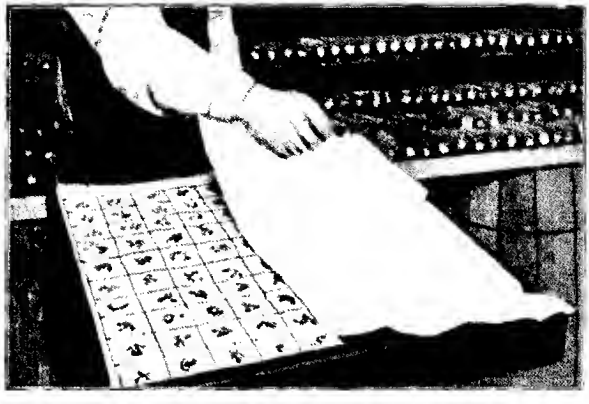


Fig. 4.—Ready for the Test.

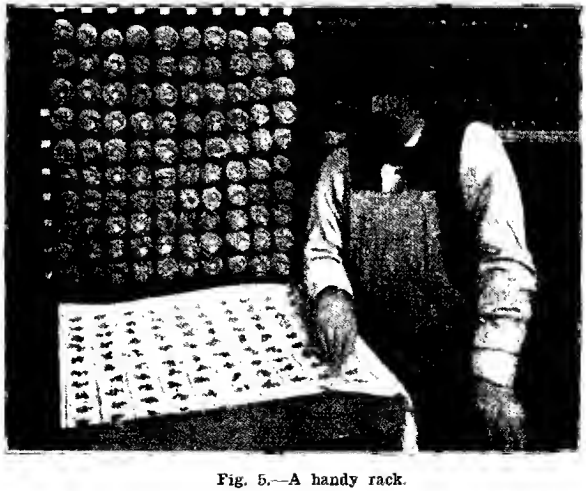


Fig. 5.—A handy rack.

mination box (any shallow box will do), put sawdust, sand, or soil on the bottom, and cover with a clean cloth or blotting paper. Place the grains on the paper, and cover with another cloth or blotting paper, and put more sand, soil or sawdust on top. Moisten well, and

keep in a warm place. Sprouting will take place in four to six days. If 95 per cent. germinate in the preliminary test, the seed is safe to sow. If less than 85 per cent germinate, it will pay to test every ear."

Ear Testing.

Lay out all your seed ears side by side on a floor, shelves, or boards, at least twelve for each acre, keep them in such order that you can easily locate each ear after testing. This is easily done by marking the ears which occupy the first space in each row of the tester. It may also be done by numbering each ear to correspond with the number of the

Fig. 6.—An ear germination test after 3 days.

squares in the tester. Prepare the germination box (Fig. 2) by placing 2 to 3 inches of sawdust, sand, or soil in the bottom, cover with white cloth marked in 2-inch squares. Remove six kernels from each ear, two from near the butt, two from the middle, and two from the tip, turn the ear partly round each time. Place the six grains from each ear in the germination box in the same order as the ears are laid out. Remove the kernels with a knife blade, and be careful not to injure the germs. (Fig. 3.) Cover the kernels with a cloth, and over this place sawdust, sand, or soil, keep well-moistened in a warm room, and in four to six days germination should be complete. Discard all ears that have not shown good, strong germination. A handy rack for drying seed corn

and keeping track of the ears in testing may be made by using 2 in. x 4 in. wood, and heavy smooth wire. (Fig. 5.) The ears in the rack correspond with the squares in the germinator, so that it is not necessary to number either ears or squares. After the test it was found some of the ears were absolutely dead, in others the sprouts were weak, while others again were vigorous. (Fig. 6.) If one ear in every forty fails you will lose 1 acre in every 40. Germinators can be made at home, the only thing necessary is to keep accurate records of the ears, and the germinator in a warm place and moist."

Time to Sow.

Good growers, in order to get a long-growing season, like to get their maize crop in as early as possible—that is, as soon as all reasonable danger of a frost is past. Nothing will, however, be gained by sowing if the land is wet and cold. Maize likes a warm seed-bed, and is likely to rot under cold, wet conditions. The grower must, therefore, use his own judgment of local conditions, bearing the above facts in mind. When sowing maize for fodder purposes any time during the months of October, November, December, and up to the middle of January will be found of advantage.

Depth to Sow.

Perhaps more mistakes are made in maize culture in Victoria by sowing too deeply than from any other cause. From 1 to 3 inches is sufficient in all well-prepared land. Deep sowing does not encourage deep rooting as is surmised, but puts an extra strain on the seed. The seed contains a supply of the requisite foods to give the plant a start in life. Should this supply run out before the blade reaches the surface, the plant is liable to die. Until it reaches the air it does not turn a green colour, and unless that occurs it cannot take in from the atmosphere that 95 per cent. of its nourishment supplied in the form of carbon dioxide. Not only is this the case, but as the young shoot gets longer under the surface it gets weaker in proportion, and when encountering lumps or a crusted surface cannot in many cases force its way through. A well-worked soil will contain the moisture to within an inch or two of the surface, where also the greatest degree of warmth is likely to be found.

In stiff, close soils a couple of inches is deep enough, while in free, friable soils 3 inches should be the maximum depth. Tests made in the United States prove that the heaviest yields were obtained from shallow sowing.

The quicker the young plant comes away and hardens the less danger there will be from cutworms and other pests.

Distances to Plant.

Here again the mistake is often made of sowing too thickly, and how common it is to find as many as one stalk in every five in a plantation non-productive. Where grain is the objective, such a condition means a serious diminution of yield, and an unnecessary drain on the food supplies of the soil.

Maize must have room for various reasons. The sun and air should have access to the whole plant, to properly mature it, and prevent disease. The soil, whatever its quality, can only produce a certain

amount of grain according to food constituents and moisture available. Considerable diversity of opinion obtains amongst growers on the question of distances, and probably always will do so, as the distances that suit one soil will not suit another.

Experience and practically testing each soil is the only safe way of arriving at the special distance to plant. On rich Orbost soils, Mr. S. J. Lynn, one of the established growers, plants 3 feet each way, dropping three seeds at each hill. Others prefer 3 ft. 6 in. between the rows, and three seeds in the row. Others again plant 4 feet apart, and drop one seed every 18 inches in the row. Rich soils containing plenty of moisture grow large stalks, and leaves, which shade the crop unduly if sown too closely, but have a better carrying capacity, consequently the probability is that such soils would yield better if the rows were 4 feet apart, with the plants three in each hill at distances in the rows of 2 to 3 feet.

Wider rows entail less cultivation as the crop grows, as a wider cultivator can be used, and more ground got over in a given time than where the rows are closer. The question of planting north and south to enable the sun to reach each side of the maize during the day with greater effect does not appear to have occurred to the Victorian grower as important, yet the effect should be good generally, and particularly as a preventive of disease, and in the cooler districts to get as much sun as possible. On poorer soils, sowing thinner on the hills gives better results with the rows 3 ft. 6 in. to 4 feet apart, according to circumstances. One grower at Bruthen stated that for years he had planted too thickly, and on reducing the seed to one per hill his yield increased from 70 to 90 bushels. It must be remembered, too, that one large ear is often better than two small ones, entailing less labour in picking and husking, while it often happens that one stalk will bear two good ears if allowed space, where only one would be the result on each stalk if planted closer, and in the latter case more stalks in proportion to grain is the result. Wherever possible it is wise to plant in check rows, so that inter-cultivation can be done in both directions, and the rows should be kept as straight as possible to facilitate this work.

When sown for fodder purposes, maize may be planted slightly thicker, but the habit of sowing broadcast is a great mistake and much too common a one. Sown broadcast and thickly the sun cannot penetrate to the bottom, and the lower leaves dry off: the stem becomes woody and indigestible: the total yield is less, and the nutritive value less also. Apart from these defects, the risk of disease is greater, and the inter-cultivation required is not possible.

(To be continued).

SILAGE.

It is, in a season like the past, when grass and crops alike have failed in many places, that the great value of silage—that permanent insurance policy against drought—is brought home to us. By enabling the surplus of a favorable season to be held over in the best condition for a subsequent unfavorable period, silage equalizes the seasons and makes the farmer practically independent of adverse weather conditions.—W. Dibble.

BEE-KEEPING IN VICTORIA.

By F. R. Beuhne, Government Apiculturist.

XXVI.—THE HONEY FLORA OF VICTORIA (*continued*).

(Continued from page 397.)

The Blackbutt (*Eucalyptus pilularis*).

Fig. 27.

A tree attaining under favorable conditions a height of 300 feet, but as a rule of much less height. Its home in this State is the wooded country of Eastern and Southern Gippsland.

The timber is excellent for general purposes, used largely for building, furnishing material for flooring boards and superior shingles; also utilised for telegraph poles and railway sleepers.

The rough bark which covers the lower part of the trunk, but sometimes continues to the branches, is blackish grey outside, somewhat fibrous and brownish inside. The bark of the branches and sometimes of the upper portion of the stem is smooth and grey, or whitish in colour.

The leaves, which are scattered on the distinctly angular branchlets, are narrow, or sickle lance shaped, rather more shining on the upper than on the lower side; the veins are numerous, but very faint.

The clusters of flowers occur mostly singly from the shoulders of leaves on a strongly compressed stalk, bearing from four to sixteen flowers. The stalklets of buds are rather thick and angular, the lids of the buds conical, distinctly pointed; the fruit is half-egg or almost cup-shaped, three or four, but rarely five celled.

The Blackbutt is one of a number of eucalypts of which, from an apicultural point of view, practically nothing authentic is known. The regrettable dearth of information as to nectar production, frequency and time of flowering and length of time in bud which still exists in regard to several eucalypts growing in the moister parts of the State, is in the first instance due to the absence of interested observers, specialist bee-keepers having so far not invaded this class of country, and secondly to the difficulty of ascertaining the sources of nectar and pollen gathered by the bees in localities where the timber is tall, largely intermingled, and several varieties flower at the same time.

The Black Sallee (*Eucalyptus stellulata*).

Fig. 28.

A tree attaining a height of 50 to 100 feet, but the diameter rarely exceeding 2 to 3 feet; at high elevations it is of a scrubby growth, and is known as Black Sallee, this word being a corruption of sallow or willow. It is also called "Black Gum" owing to the rough hard dark bark on the butt, and "Green Gum" on account of the greenish or bronze coloured bark on the upper portion of the stem.

The timber is pale coloured, rarely free from gum veins, and of little value except for fuel. This is a gum, or smooth-barked

eucalypt; it has, however, more or less rough bark towards the butt, which in old trees is hard, rough and black; the upper part of the trunk is, as already mentioned, greenish, bluish, or white.

The leaves are scattered, on rather short stalks, oval lance to narrow lance shaped, shining, and of equal colour on both sides, the veins

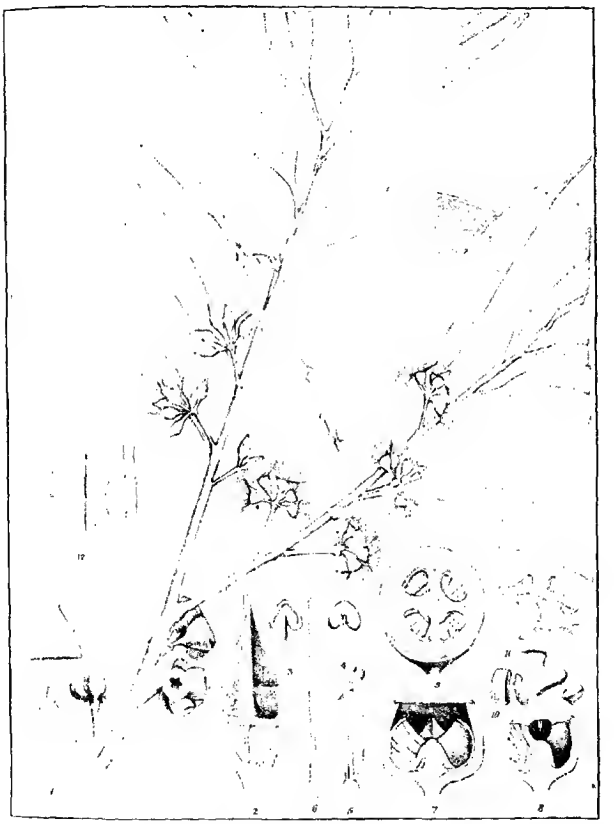


Fig. 27.—**The Blackbutt** (*Eucalyptus pilularis*, Smith).

almost lengthways of the leaf. The flowers are very small, almost stalkless, very numerous, six to fifteen arranged star-like in the cluster (hence the botanical name *E. stellulata*). The buds rather long and conical; the fruits are very small, half-round or cup-shaped, and mostly three-celled.

In Victoria the Black Sallee is found on the Mitta Mitta, Ovens, and the Dargo High Plains. There is a narrow-leaved variety growing at higher elevations, which is of a shrubby habit.

No information is yet available as to the value of this tree to bee-culture.

Fig. 28.—Black Sallee (*Eucalyptus stellulata*, Sieb).

White Sallee (*Eucalyptus pauciflora*).

Synonym E. coriacea.

Fig. 29.

A medium-sized tree, but sometimes attaining a height of 100 feet: it is known by several other vernacular names such as White Gum, Willow Gum, White Sallee, distinguishing it from Black Salee (*E. stellu-*

lata), Tumble Down Gum by reason of its aspect, Glassy Gum on account of the glassy appearance of the upper bark; while in Tasmania, on account of its scrambling nature, it is called Weeping Gum.

In Victoria it is found in the southern districts on the lowest hills and the highest mountains. The timber is pale-coloured, full of gum

Fig. 29.—White Sallee (*Eucalyptus pauciflora, syn. E. coriacea*, A. Cunn).

veins, and warps a good deal; the limbs bend and twist without breaking; its chief local uses are for fuel and fencing posts, as it is very durable. The bark is distinctly of the White Gum type, the trunks of the trees being mostly quite clean down to the ground.

The leaves are scattered on the branchlets, leathery, yet often succulent, long lance, but sometimes somewhat sickle shaped, or merging

into the oval form. They are of equal colour and shining on both sides, the veins very oblique, almost parallel to the mid-rib. The flower clusters, which occur mostly singly at the shoulders of leaves, but sometimes form a spray, carry from few to many flowers; the buds are round-ended, more or less pointed; the fruits are half-round to cup-shaped, three, more rarely four or five celled.

This is a very profusely flowering eucalypt, yielding honey of the White Gum type, clear, transparent, of a golden colour, but not of high density. As in other species it varies somewhat in colour and character, according to soil, climate and elevation. Pollen is gathered by the bees from the flowers, as from all other trees known as White Gums with the exception of *E. leucoxylon* (The Yellow Gum), which passes as a White Gum in some localities. As with most of the White Gums, the time of flowering is very variable, and the length of time the White Sallee is in bud has not so far been ascertained.

THE SNOW GUM (*Eucalyptus pauciflora variety alpina*).

This is a variety of the White Sallee, frequently high mountain localities. It has short and nearly straight leaves, and is but a tall shrub or small tree, with more or less whitish bloom on the foliage.

The trees of this species at the highest elevations are remarkable for their bare stems, surmounted with a dome or flattish top of leaves. The bare stems are doubtless the consequence of winds, the leaves being concentrated on top as a thin layer, and offering a minimum resistance to the wind. A fruiting twig of this variety is shown in the right top corner of the illustration (Fig. 29).

(To be continued.)

QUICKSILVER IN CHEESE.

An accident, which is probably not infrequent in cheese factories, lately brought a cheese manufacturer and his assistants before the local court at Memmingen.

The defendant was engaged in preparing the daily batch of cheese, and while so engaged the thermometer which he used to test the temperature of the milk in the cheese kettle, happened to break, with the result that the mercury in the bulb of thermometer became mixed with the coagulated milk and thus was found in the cheese.

The cheese-maker, however, proceeded with his operations, and although he could have called up his employer by telephone, he omitted to do so.

In due course the cheese went upon the market and a purchaser discovered the globules of quicksilver.

The court sentenced the cheesemaker to imprisonment for two weeks, and in addition ordered him to pay the costs of the trial.—[Extract from *Pure Products*, March, 1915.]

VERNACULAR NAMES OF VICTORIAN PLANTS.

Continued from page 91, Vol. XII. (10th February, 1914.)

Communicated by Alfred J. Ewart, D.Sc., Ph.D., Chairman, and C. S. Sutton, M.B., Ch.B., Secretary of the Plant Names Committee of the Field Naturalists' Club of Victoria.

In the *Journal of Agriculture* for June and August, 1911, a list of the vernacular names for approximately one-third of the Victorian flora was given, the second-third was published in the *Journal of Agriculture* for July and September, 1912, and February, 1914.

The present list will complete the Vernacular Names of Victorian Plants. This portion of the list includes the majority of our forest trees, and it is hoped that the economic data attached to the various species of our Eucalypts will draw attention to the importance of certain much neglected trees. The economic data given for these trees have been revised by Mr. H. R. Mackay, Conservator of Forests. In addition, a very large number of the Myrtaceae are plants of great decorative value.

The completion of the list has involved nearly sixty meetings of the committee.

The working committee by whom the final decisions have been made are:—

Chairman: A. J. Ewart, D.Sc., Ph.D., &c.
Honorary Secretary: C. S. Sutton, M.B., Ch.B.
Committee: F. G. A. Barnard, J. A. Leach, D.Sc., F. Pitcher, P. R. H. St. John, and J. R. Tovey.

Useful assistance has been received from Messrs. G. H. Adcock, A. C. Dreverman, J. P. Eckert, R. Kelly, J. P. McLennan, E. E. Pescott, L. Rodway, and Rev. R. Thom, and minor suggestions have been received from a large number of correspondents.

Botanical Name.	Popular Name.	Use or Character.
	CHORIPETALEÆ PERIGYNÆ—*continued.*	
CALLITRICHACEÆ		
Callitriche—		
verna, L.	Variable Water-Starwort..	Water weeds of no known economic value.
Muelleri, Sonder. ..	Round Water-Starwort ..	
MYRTACEÆ.		[All the Victorian Myrtles are aromatic, and almost without exception of value for their timber, oils or as garden plants.]
Baeckea—		
ericifolia, Cunn.	Yew Scent-Myrtle ..	Worthy of garden culture.
micrandra, Benth. ..	Small Scent-Myrtle ..	
Homoranthus—		
virgatus, A. Cunn. ..	Twiggy Scent-Myrtle ..	
Calythrix—		
tetragona, Labill. ..	Common Fringe-Myrtle ..	Handsome shrubs of great decorative value.
Sullivani, F.v.M. ..	Grampian Fringe-Myrtle ..	
Lhotzkya—		
genetylloides	Snow Myrtle	

Vernacular Names of Victorian Plants—*continued.*

Botanical Name.	Popular Name.	Use or Character.

Choripetaleæ Perigynæ—*continued.*

Myrtaceæ—continued.

Thryptomene—		
*Mitchelliana, F.v.M. ..	Bushy Heath-Myrtle ..	One of the most beautiful native shrubs. Grows well in gardens.
ericæa, F.v.M. ..	Dwarf Heath-Myrtle ..	Worthy of garden cultivation.
Micromyrtus—		
microphylla, Benth. ..	Fringed Heath-Myrtle ..	Worthy of garden cultivation.
Baeckea—		
diffusa, Sieber ..	Spreading Heath-Myrtle ..	All are attractive shrubs worthy of garden cultivation.
crassifolia, Lindl. ..	Desert Heath-Myrtle ..	
ericæa, F.v.M. ..	Small Heath-Myrtle ..	
Gunniana, Shauer ..	Mountain Heath-Myrtle ..	
linifolia, Rudge ..	Flax Heath-Myrtle ..	
camphorata, R.Br. ..	Camphor Heath-Myrtle ..	
virgata, Andrews ..	Twiggy Heath-Myrtle ..	
crenulifolia, F.v.M. ..	Fern Heath-Myrtle ..	
Behrii, F.v.M. ..	Broom Heath-Myrtle ..	
Leptospermum—		
*lævigatum, F.v.M. ..	Coast Tea Tree	Very useful for arresting drift sand, on seashores or sand deserts, also a splendid hedge plant.
flavescens, Smith ..	Yantoon ..	Wood hard and close-grained; diameter, 3 to 8 inches; height, 15 to 20 feet.
scoparium, R. and G. Forster	Manuka ..	The leaves have been used as a substitute for tea, but the taste of the infusion is too aromatic to be palatable.
lanigerum, Smith ..	Woolly Tea-Tree ..	The wood hard and heavy. Used by the Aborigines for making spear handles. The flowers last well when cut and useful for sprays.
attenuatum, Smith ..	Slender Tea-Tree ..	Could be used as a hedge plant in most situations.
myrtifolium, Sieber ..	Myrtle Tea-Tree ..	Wood close-grained, tough, dark in colour; height, 8 to 10 feet.
myrsinoides, Schlecht. ..	Myrrh Tea-Tree ..	An ornamental shrub, worthy of garden culture.
Kunzea—		
Muelleri, Benth. ..	Yellow Kunzea ..	Worthy of cultivation. The wood of K. pedunculosa was used by the Victorian aborigines for waddies, boomerangs, &c.
parvifolia, Schauer ..	Crimson Kunzea ..	
pedunculosa, F.v.M. ..	Burgan ..	
corifolia, Reich. ..	White Kunzea ..	
pomifera, F.v.M. ..	Muntries	The berries of this shrub are useful for making jam or preserves.
Callistemon—		
*lanceolatus, D.C. ..	Crimson Bottlebrush ..	Wood hard and heavy; it is used for wheelwrights' work, &c.
*coccineus, F.v.M. ..	Scarlet Bottlebrush ..	Worthy of garden cultivation.
salignus, D.C.	Willow Bottlebrush ..	Wood very hard and close-grained; durable underground; also useful for engraving.
paludosus, F.v.M. ..	Swamp Bottlebrush ..	All are useful for garden culture.
Sieberi, D.C.	Mountain Bottlebrush ..	
pithyoides, Miquel ..	Pine Bottlebrush ..	
linearis, D.C.	Narrow-leaved Bottlebrush ..	
brachyandrus, Lindl. ..	Prickly Bottlebrush ..	
Melaleuca—		
*hypericifolia, Smith ..	Red Honey-Myrtle ..	Worthy of garden cultivation.
acuminata, F.v.M. ..	Snowy Honey-Myrtle ..	
gibbosa, Labill.	Slender Honey-Myrtle ..	
decussata, R.Br. ..	Cross Honey-Myrtle ..	Wood hard and tough. Leaves, &c., yield an essential oil.
Wilsonii, R.Br. ..	Purple Honey-Myrtle ..	Yields a pale yellow-coloured oil. Flowers brightly coloured.
squarrosa, Donn. ..	Scented Paper-Bark ..	Wood hard, dense, and durable under water. Its oil is green-coloured.
parviflora, Lindl. ..	Moonah	Useful as a sand stay.

* Plants marked thus are listed either as growing plants or as seeds by one or more of our florists.

Vernacular Names of Victorian Plants—*continued.*

Botanical Name.	Popular Name.	Use or Character.
Choripetaleæ Perigynæ—*continued.*		
Myrtaceæ—*continued.*		
Melaleuca—continued.		
armillaris, Smith	Bracelet Honey-Myrtle	Wood hard and durable for inside, underground, or water work.
uncinata, R.Br.	Broom Honey-Myrtle	Yields a green oil. Wood very hard, close, durable.
squamea, Labill.	Mealy Honey-Myrtle	No special value.
ericifolia, Smith	Swamp Paper-Bark	Yield is a pale yellow oil. This wood is extensively used for bush fences, rustic work, clothes props, &c.
pustulata, Hook. f.	Blistered Honey-Myrtle	Of no known economic value.
nesophila, Ewart and Wood	Mallee Honey-Myrtle	"
Angophora—		
intermedia, D.C.	Gum Myrtle	An ornamental shade tree, whose timber is useful for naves and spokes of wheels, but is often subject to gum veins.
Eucalypts.		
1. *Renantheræ*—		
stellulata, Sieber	Black Sallee	Stands frost well. Fairly good fuel.
*pancifloru, Sieber	White Sallee	Wood soft and short-grained. Used for fencing purposes. Good fuel.
var. alpina	Snow Gum	
*regnans, F.v.M.	Mountain Ash Gum	A long-grained, fairly light timber. Often has a handsome figure. Largely used in building construction, cask-staves, split palings, and mine laths. Useful for carriage-building, panelling, and furniture.
*amygdalina, Labill.	Narrow-leaved Peppermint	Useful for palings, shingles, and rails, also for general building purposes. Yields a useful oil.
radiata, Sieb.	River White Gum	Yields a useful oil, strongly levorotatory, and containing only a trace of Eucalyptol.
dives, Schauer	Blue Peppermint	Chief source of "Eucalyptus." Useful in flotation of metals.
*obliqua, L'Herit	Messmate	Good useful for general sawn timber in building construction. A useful substitute for oak in Australian made furniture.
vitrea, Baker	White top Gum	Timber hard and close grained, but at present of little economic value.
*sutallifolia, F.v.M.	Sugar Gum	Good oil yielder.
*macrorhyncha, F.v.M.	Red Stringy-bark	Timber hard and durable; splits well. Used largely for framework of buildings, bridge piles and beams, fence posts, and telegraph poles.
capitellata, Smith	Brown Stringy-bark	Useful for fence rails, shingles, and building purposes, also telegraph poles.
*Muelleriana, Howitt	Yellow Stringy-bark	A very durable timber in contact with the ground. Used for framework, railway rolling-stock, wharf and jetty timbers, building material, and for piles, telegraph poles, &c.
*eugenioides, Sieber	White Stringy-bark	Yield is a good timber, generally useful for building purposes, railway sleepers, piles, and poles.
var. nana	Dwarf White Stringy-bark	
*piperita, Smith	Peppermint Gum	Timber useful for posts, shingles.
*obliqua, Smith	Stringybark	A good timber, generally useful for railway sleepers and telegraph poles, also for building construction.
*macrorhyncha, Smith	Brown Messmate	Timber not very durable. Fair fuel. Used for rough buildings, fencing, &c.
Consideniana, Maiden	Bastard	Useful for fence posts, bridge-decking, rails, &c. The oil is useful.

* Plants marked thus are listed either as growing plants or as seeds by one or more of our florists.

Vernacular Names of Victorian Plants—*continued.*

Botanical Name.	Popular Name.	Use or Character.
Choripetaleæ Perigynæ—*continued.*		
Eucalyptus—*continued.*		
1. *Renantherae*—continued.		
*Sieberiana, F.v.M.	Silver-top	Light, long-grained timbers, which season well, are easily wrought, and take a *good* finish. They are useful for ship building, cart-shafts, general building purposes, and furniture.
delegetensis, R. T. Baker	Red Mountain Ash	
2. *Paranthera*—		
*paniculata, Smith	Grey Iron-bark	Useful timber, especially where great strength and durability are required. Yields excellent railway sleepers, beams or girders, piles, and telegraph poles.
fasciculosa, F.v.M.	Pink Gum	A good timber for framework of buildings. Makes durable fence posts. Yields fair fuel.
*sideroxylon, Woolls	Red Iron-bark	Excellent heavy timber, resistant to white ants and teredo. Used for railway sleepers, beams, and girders, wharf construction, piles, telegraph poles, and mine props, and for many kinds of building purposes.
*leucoxylon, F.v.M.	Yellow Gum	Excellent timber. Useful for general building purposes. Used for railway sleepers, telegraph poles, and piles.
*melliodora, Cunn.	Yellow Box	Wood hard, resistant to teredo, useful for shipwrights and coach-builders. A good honey tree. Yields durable railway sleepers, piles, poles, and foundation timbers of wooden houses.
*polyanthemos, Schauer	Red Box	*Durable timber, good fuel, stands* well in salt water. Rivals ironbark for railway sleepers and piles.
calycogona, Turcz. (gracilis, F.v.M.)	Slender Mallee	These Mallees are too small to be useful as timber trees, but Eucalyptus oil is extracted from them. That of E. polybractea contains over 75 per cent. of Eucalyptol. Their roots form excellent fuel and are used for ornamental rustic work.
viridis, R. T. Barker	Green Mallee	
polybractea, R. T. Baker	Blue Mallee	
uncinata, Turcz.	Hooked Mallee	
Bauerina, Schauer	Fuzzy Box	
odorata, Behr.	Scented Peppermint	
*Bosistoana, F.v.M.	Gippsland Box	durable timber. Useful for railway sleepers, piles, poles, and for wharf and jetty construction.
*bicolor, A. Cunn. (largiflorens, F.v.M.)	Black Box	The timber is hard, tough, and very durable both above and below ground. Useful for railway sleepers, foundations of buildings, poles, and fence posts.
Behriana, F.v.M.	Bull Mallee	Yields Eucalyptus oil. Useful for fuel.
*hemiphloia, F.v.M.	Grey Box	Excellent for fuel. Timber hard and durable in all situations. Largely used for railway sleepers, piles, and telegraph poles.
var. albens	White Box	
3. *Parallelantherae*—		
*alpina, Lindl.	Grampians Gum	Timber of no commercial value.
*globulus, Labill.	Blue Gum	One of the best of our hardwoods, as durable as and stronger than British Oak. Also valuable for its oil.
Maideni, F.v.M.	Spotted Blue Gum	Somewhat similar to the preceding.
*longifolia, Link.	Wollybutt	A very useful timber for railway sleepers, bridge decking, house framing, fence posts, and felloes.
*botryoides, Smith.	Mahogany Gum	A handsome shade tree; timber hard, tough, and durable, useful for shipbuilding.

* Plants marked thus are listed either as growing plants or as seeds by one or more of our florists

Vernacular Names of Victorian Plants—*continued.*

Botanical Name.	Popular Name.	Use or Character.
Choripetaleæ Perigynæ—*continued.*		
Eucalypтus—*continued.*		
3. *Parallelantherae*—continued.		
*goniocalyx, F.v.M. ..	Grey Gum	Timber durable, tough; useful for wheelwrights' work.
nitens, Maiden	Shining Gum	Timber straight in grain, useful for rough wood-work.
oleosa, F.v.M. ..	Long-leaf Box	Timber has apparently no commercial value, except for fuel.
incrassata, Labill. ..	Giant Mallee	Useful for fuel, especially its roots.
incrassata, var. dumosa ..	Small Mallee	
oleosa, F.v.M.	Oil Mallee	Yields Eucalyptus oil.
*cladocalyx, F.v.M. / *(corynocalyx), F.v.M.)	Sugar Gum ..	The timber is useful for railway sleepers, *piles, telegraph poles, and fences.* A fast-growing tree, used extensively for shelter and wind-breaks.
Gunnii, Hook. f. ..	Cider Gum	A kind of cider has been made from the sap.
camphora, R. T. Baker ..	Sallow Gum	Timber is soft, pale-coloured, of poor commercial value.
paludosa, R. T. Baker ..	Swamp Gum	Timber hard, close-grained. Cut into rough building timber, mine props, and fuel.
Kitsoni Lenhm. and Maiden	Dwarf Gum	Roots and stumps used as fuel. Oil valuable.
neglecta, Maiden ..	Neglected Gum ..	Of no known economic value.
cinerea, F.v.M.	Mealy Stringy-bark ..	A fair fuel.
Smithii, R. T. Baker ..	Gully Gum	Timber is close-grained, hard, and difficult to work. Valuable as an oil yielding tree.
maculosa, R. T. Baker ..	White Brittle Gum ..	Timber of poor commercial value.
*Stuartiana, F.v.M. ..	Apple Gum	Timber is useful for ships' planks, and an excellent fuel. Cut also for railway sleepers and for rough building purposes.
Bridgesiana, R. T. Baker	But But	Timber is fairly hard, but only useful for indoor work. A fairly good fuel.
*viminalis, Labill. ..	Manna Gum	Timber very variable in quality. Used for rails, shingles, and building material; also for mine props and laths.
rubida, Deane and Maiden	Candle Bark Gum ..	Timber of not much use commercially.
*rostrata, Schlecht ..	River Red Gum ..	Timber hard, valued for its durability in contact with the ground, and is used for railway sleepers, piles, shoot beams, bed-logs, mine shafting, keelsons, and paving blocks. Resists white ants and teredo.
*tereticornis, Smith ..	Forest Red Gum ..	Timber indistinguishable from that of Euc. rostrata, but generally has fewer gum-veins than latter. Very durable.
*corymbosa, Smith ..	Blood Wood	Timber used in fencing, and as piles or sleepers. Resistant to white ants and teredo.
maculata, Hooker ..	Spotted Gum .. .	Timber used in ship building, street paving, wheelwrights' work, framework, and railway carriage building.
Tristania—		
laurina, R.Br.	Kanooka	Timber dark in colour, hard, tough, and close-grained. Used for tool-handles cogs of wheels, &c.
Backhousia—		
myrtifolia, Hook and Harvey	Grey Myrtle	Useful for garden culture.
Eugenia—		
*Smithii, Poiret	Lilly Pilly	A handsome tree makes a good hedge or flowering tree in gardens. The fruits are acid and wholesome; wood close grained but apt to split in seasoning. It makes good axe handles.

* Plants marked thus are listed either as growing plants or as seeds by one or more of our florists.

Vernacular Names of Victorian Plants—*continued.*

Botanical Name.	Popular Name.	Use or Character.
Choripetalæ Perigynæ—*continued.*		
Rhamnaceæ.		
Pomaderris—		
lanigera, Sims	Woolly Pomaderris ..	Useful for garden culture.
formicinea, Sieb. ..	Rusty Pomaderris ..	
elliptica, Labill. ..	Oval Pomaderris ..	
vaccinifolia, Reiss. ..	Round-leaved Pomaderris	
ledifolia, Cunn. ..	Eastern Pomaderris ..	
apetala, Labill.	Hazel Pomaderris ..	The wood is of satiny texture, and adapted for carvers' and turners' work.
rinerea, Benth.	Grey Pomaderris ..	Useful for garden culture.
prunifolia, Cunn. ..	Plum-leaved Pomaderris ..	
ligustrina, Sieber ..	Privet Pomaderris ..	
betulina, Cunn.	Birch Pomaderris ..	
obcordata, Fenzl. ..	Lobed Pomaderris ..	
racemosa, Hook. ..	Clustered Pomaderris ..	
sinuata, Reiss	Wrinkled Pomaderris ..	Although the flowers are small, those with close clusters may prove worthy of garden cultivation.
phylicifolia, F.v.M. ..	Small-leaved Pomaderris ..	
phylicifolia, Lodd. ..	Narrow-leaved Pomaderris ..	
Trymalium—		
Daltoni, F.v.M.	Grampians Trymalium ..	
Cryptandra—		
propinqua, Cunn. ..	Silky Cryptandra ..	
amara, Smith	Prickly Cryptandra ..	
tomentosa, Lindl. ..	Downy Cryptandra ..	
leucopiracta, Schlech. ..	White Cryptandra ..	
Scortechinii, F.v.M. ..	Shiny Cryptandra ..	
Spyridium—		
serpyllaceum, F.v.M. ..	Lobed Spyridium ..	
parvifolium, F.v.M. ..	Dusty Miller	
spathulatum, F.v.M. ..	Spoon-leaved Spyridium ..	
bidlum, F.v.M.	Forked Spyridium ..	
subarbreatum, Reissk. ..	Velvet Spyridium ..	
vexilliferum, Reissk. ..	Wand Spyridium ..	
ericocephalum, Fenzl. ..	Heath Spyridium ..	
Discaria—		
australis, Hook	Austral Anchor Plant ..	A garden curiosity.
Vitaceæ.		
Cissus—		
Baudiniana, Brouss. ..	Kangaroo Vine ..	Of no known economic value.
hypoglauca, A. Gray	Water Vine	Yields black edible fruits of the size of small cherries.
Araliaceæ.		
Astrotricha—		
ledifolia, D.C.	Starhair	Of no known economic value.
Panax—		
Murrayi, F.v.M. ..	Large-leaved Panax ..	Wood of a light colour, soft, useful for lining boxes.
sambucifolius, Sieber ..	Elderberry Panax ..	The wood is sound and very tough. Used for axe handles.
dendroides, F.v.M. ..	Tall Panax	Somewhat similar to the preceding.
Umbelliferæ.		
Hydrocotyle—		
vulgaris, L.	Common Pennywort ..	Of no known economic value.
hirta, R.Br.	Hairy Pennywort ..	
laxiflora, D.C. ..	Stinking Pennywort ..	
tripartita, R.Br. ..	Slender Pennywort ..	
pterocarpa, F.v.M. ..	Wingfruited Pennywort ..	
geranifolia, F.v.M. ..	Forest Pennywort ..	
medicagnioides, Turcz. ..	Trefoil Pennywort ..	
callicarpa, Benth. ..	Small Pennywort ..	
capillaris, F.v.M. ..	Thread Pennywort ..	

Vernacular Names of Victorian Plants—*continued.*

Botanical Name.	Popular Name.	Use or Character.

Choripetaleæ Perigynæ *continued.*

Umbelliferæ—continued.

*Hydrocotyle—*continued.
- *Hydrocotyle*—continued.
  - *asiatica*, L. — Indian Pennywort — In India, this plant is used both as an external and as a local remedy for certain skin diseases.

- *Didiscus*—
  - *pusillus*, F.v.M. — Small Didiscus
  - *cyanopetalus*, F.v.M. — Blue Didiscus
  - *glaucifolius*, Benth. — Wild Parsnip
  - *glaucifolius*, F.v.M. — Grey Didiscus
  - *humilis*, Hook. f. — Alpine Didiscus

  All are more or less troublesome weeds either in pastures or in cultivated ground.
- *Trachymene*—
  - *heterophylla*, F.v.M. — Slender Trachymene
  - *ericoides*, Sieber — Heath Trachymene
  - *Billardieri*, F.v.M. — Shrubby Trachymene
- *Xanthosia*—
  - *tridentata*, D.C. — Rock Xanthosia
  - *pilosa*, Rudge — Woolly Xanthosia
  - *pusilla*, Bunge — Hairy Xanthosia
  - *dissecta*, Hook. f. — Cut-leaved Xanthosia
  - *Atkinsoniana*, F.v.M. — Tall Xanthosia

- *Azorella*—
  - *Mueller*, Benth. — Pennywort Azorella
  - *cuneifolia*, F.v.M. — Wedge-leaved Azorella
  - *diapensiifolia*, Benth. — Hairy Azorella

  Plants of no economic value.
- *Hannonia*—
  - *hydrocotyloides*, Benth. — Snow Pennywort
- *Actinotus*—
  - **Helianthi*, Labill. — Common Flannelflower
  - *Gibbonsii*, F.v.M. — Small Flannelflower

  Well worth garden cultivation.
- *Eryngium*—
  - *rostratum*, Cav. — Blue Eryngo
  - *vesiculosum*, Labill. — Trailing Eryngo

  Useless and troublesome weeds.
- *Apium*—
  - *prostratum*, Labill. — Sea Celery
  - *leptophyllum*, F.v.M. — Slender Celery

  Might be utilized as a culinary vegetable. Has a slight pasture value.
- *Sium*—
  - *latifolium*, L. — Water Parsnip
- *Seseli*—
  - *Harveyanum*, F.v.M. — Alpine Seseli
  - *ligusticum*, F.v.M. — Snow Seseli

  Of no known economic value.
- *Crantzia*—
  - *lineata*, Nuttall — Creeping Crantzia
- *Aciphylla*—
  - *simplicifolia*, F.v.M. — Mountain Aciphylla
  - *glacialis*, F.v.M. — Snow Aciphylla
- *Daucus*—
  - *brachiatus*, Sieber — Austral Carrot — When abundant, has a slight pasture value especially for sheep. Gives an unpleasant flavour to milk and butter of cows.

- *Ozomeris*—
  - *australis*, Endl. — Australian Carroway
  - *pulvinifera*, F.v.M. — Cushion Carroway

  Of no known economic value.

* Plants marked thus are listed either as growing plants or as seeds by one or more of our florists.

(To be continued.)

THE MANAGER—HIS INFLUENCE ON THE OUTPUT.*

By J. S. McFadzean, Senior Dairy Supervisor.

To first thought, it might appear that the duties of manager in a cheese or butter factory are mainly confined to the manufacture of a good commercial product. Certainly, the ability to turn out uniformly good saleable produce from the varying quality of milk or cream supplied by the average farmer is a most necessary item in his numerous qualifications; still, most managers will admit that this is by no means the most difficult part of the work. Scientific research has, to a considerable extent, reduced the main variations in the manufacture of dairy produce to questions of acidity and temperature, the problems of which are possible of being mastered by a reasonable amount of study and practice; but the many qualifications other than this which combine to make the successful manager are inherent in the individual—natural gifts, possibly latent, but capable of much development. The position of manager affords great opportunity for individual initiative, and many have succeeded in building up trade where others have failed. Weather conditions, of course, largely control the cream supply at every factory; but, apart from this, increase of business will come to some managers without any apparent effort. Others not so fortunate may set this down to luck, but there is more than mere chance behind it; and a little observation will disclose the fact that the successful manager has a knack of building up trade that is peculiarly his own, and it is the outcome of tactful, resourceful, and forceful method.

Looking closer into this, it may be seen that, apart from a scientific and practical knowledge of his work, to be successful, a manager must possess good business acumen, determination and tenacity of purpose, tact and initiative, and it will also be most advantageous to him to have a leaning towards scientific agriculture. Foremost amongst these may safely be set that most valuable qualification—business ability; meaning in this instance not so much a knowledge of finance, or keenness in making a bargain, but particularly calling for honest trading, and a determination to see that both the factory and its suppliers get their fair due. For instance, should it happen that a somewhat graspin individual—and there are such—be both a cream supplier and one of the factory directors, and thus in a position of some authority over the manager, it may require no little tact on the part of the latter to keep the scales of justice on an even balance. To in any way favour one supplier is to be somewhat unfair to all others, and it is better to risk offending by fair than by unfair dealing; for while the latter is in danger of disclosing itself at any time, the straight course makes for universal confidence. This confidence of his suppliers is the best safeguard the manager can have against interference with his supply by trade competitors, being in itself a potent factor in building up trade, and it is absolutely essential to success.

To be able to distinguish between those suppliers who bring in low-grade cream inadvertently, and such as are careless in their methods,

* An address delivered before Factory Managers' Conference at Melbourne, May, 1915.

also requires some little study. A few well-directed questions may in some instances suffice to discover the truth, but other cases may continue to puzzle the manager for some time, even, perhaps, until an inspection is made of the dairy farm. In dealing with such, assistance can frequently be had from the district dairy supervisor by acquainting him with the trouble, and asking for a quiet investigation, which will invariably be attended to. But where the Government inspection of dairy farms has not yet become operative, the manager may have to personally make the inquiry. It is here a knowledge of the producer's side of the business will be necessary; for water supply, drainage, ventilation, fodder, method of feeding, and health of cattle, as well as the handling of the milk and cream, may all call for investigation, to do which the manager will require to be what the Americans would call "some" dairyman.

When occasion demands that advice or other instruction regarding his cream supply has to be imparted to a client, the astute manager will always give it personally and privately, allowing each to keep their own counsel on the matter if they so desire, and they will respect him for it. Most suppliers will take heed of what is said to them privately, whereas an attempt to correct their shortcomings in the presence of others will invariably give offence, and enmity may be thus incurred, and custom lost. Straight talking makes good friends if only discretion is exercised in its use.

Other classes of customers requiring some tact to handle are those who imagine they are not getting a fair cream test, and who are continually changing about from one factory to another in search of better results. Some of these are careful people, who can be brought to have confidence in their local factory by closer acquaintance with the manager and his working methods; but others are so mistrusting that it is hard to deal with them. Usually, the fault lies with themselves, their style of trading being characteristic of their dairying methods; and the dairy farmer who lacks system in the handling and the delivery of his cream will certainly have variation in its quality and test. With these, it is well to bear in mind that there is always the possibility of reforming even the most erratic of individuals, and the manager who will go out of his way to smooth over the difference by finding the cause of dissatisfaction, will more than likely ultimately win the supplier's confidence, and his improved custom permanently. The satisfied customer is the best advertisement the factory can have, and the watchful manager will not allow a supplier to go elsewhere if a special effort will retain him. He can look him up for a quiet talk at a sale, or on market days, but for preference call on him at his farm. In most cases the farmer is more approachable at home, and the interest shown in his supply will be appreciated; so that, if the difference between them is not there and then adjusted, the call will at least leave the way clear for the farmer to again become a supplier without having practically to acknowledge he had made a mistake in leaving the factory, as he will probably quickly find out. Broadly speaking, the local factory should be the best for every farmer in the district, and the manager should see that he gets all of the trade. Providing he is strictly impartial in his business methods, the farmers will give him full credit for hustling for trade, and they will also give him much assistance when

they see he is working for it. In short, by the exercise of tact, hustle, and perseverance, combined with honest trading, the suppliers may be brought to work with the manager to increase the business of the factory, and all will benefit thereby.

So far, however, these are all matters within the direct province of every manager in the country factories, but there are many who can and do go much beyond this in building up trade. An abundance of fodder is necessary to produce a good cream supply; and in many instances the manager will be found to have increased his output considerably by interesting himself in the farm work of his clients. Many farmers will benefit by being reminded each month in respect to fodder sowings. Their main crops of hay, potatoes, or maize, will be regularly put in; but the necessity for having an additional acre or so for early green stuff, mangels, or a late crop of maize, may be easily overlooked; and it is these early and late sowings that most frequently carry the milking herd safely through some critical time in the autumn or winter months. Even where the manager feels that he is not qualified to give advice on farming matters, he may meet the situation by keeping in a handy position one of the farming calendars distributed by the city seed firms, and which give directions for this work, and by reference thereto when occasion offers he can raise a discussion in regard to what should be sown. There are very few farms in the State on which an even milk supply can be maintained without growing fodder to support the grazing, and every one interested in the production of dairy produce should miss no opportunity to push the advantages of cultivation. There are still many farms on which even the household vegetables are not grown, much less fodder for the cattle; but, by constantly hearing others talking about what crops they have coming on, even these owners may be brought to make a move on similar lines. Some will, however, require it to be repeatedly demonstrated to them that the fodder growers have cream to sell, when they themselves are getting no returns, before they will improve their methods. Even in a district where cultivation is fairly general an occasional discussion amongst the farmers will do much good; for it not only brings out the experiences of each, but it tends to stimulate a friendly spirit of emulation amongst them, spurring each to his best work.

Every district has variations of climate, soil, or situation, which preclude definite rules being laid down for fodder cultivation; but the following short calendar shows those crops capable of being successfully grown in the dairying districts of this State under normal weather conditions, and within the months specified:—

February to April	..	Rape, barley, rye, sowing with either barley or rye, a proportion of peas or tares.
April to July	..	Oats with tares.
August and September	..	Mangels, carrots, swede turnips.
October and November	..	Pumpkins, millet and early varieties of maize, such as Pride of the North and Early Leaming.
November and December	..	Hickory King, Eclipse or Yellow Dent maize.
January and February	..	Early varieties of maize again.
January to October	..	Cabbage.

With maize, mangels, pumpkins, rye, or barley, should the soil be at all dry, it is well to soak the seed for at least a full day before sowing, to insure even and quick germination.

To keep the herd well supplied, a sowing of some fodder crop should be made at least every second month throughout the year, allowing that the area sown each time will provide fully 10 cwt. of green feed for each cow, and not less than 15 cwt. per head for the autumn and winter months.

It is impossible to over-emphasize the necessity for dairy farmers having an abundance of fodder on hand at all times; and, should favorable seasons provide what might appear to be a superabundance, let the oft repeated and thoroughly sound advice given previously at this annual conference by others be then put to practical effect by making all such surplus into silage, and an officer of the Agricultural Department will oversee the operation if required. The farmer with a full silo has no immedate fears of a drop in his milk yield; even a three months' dry spell will trouble him little, though his less provident neighbours may see their returns dwindle to vanishing point through the want of succulent fodder. From month to month, without fail, talk cultivation and care of the milking stock, and the factory returns will continue to increase.

Reference need hardly be made here of the advantages arising from the establishment of farmers' clubs or associations for co-operation in purchasing household or farm necessaries and the marketing of produce. It is in connexion with our factories that this has been most generally carried out in this State already; but every movement of this sort that brings farmers together is of benefit to the factory, for interchange of ideas and experiences makes for all round improvement.

It will be recognised that all that has been said here on this subject is with the object of making the factory a centre of information to its suppliers, for only too often will it be found of no more interest to them than the cream-stand on the roadside, and somewhat behind the railway siding. This should not be. The factory should be something more to the farmer than a dumping platform for his cream. He should feel that it is working in sympathy with him, and for him; and he will reciprocate. To those who have not already opened out on these lines, it may appear that the suggestion means increasing the work, but those who take it up find recreation in it. It puts life into a man to feel that he is building up a business, and especially when he is helping others thereby; and all country businesses are built up most surely by those who understand and work in sympathy with their clients. Certainly the opportunity to occasionally get out amongst the farmers is not always afforded the manager, and here there may be an oversight on the part of the owner or directors; but the go-ahead manager will usually overcome this, for, when the factory returns begin to show that he is getting hold of the trade, there is not likely to be much opposition to any project to increase it. At the outset of this paper, *resourceful* and *forceful* were two of the terms used in describing a successful manager's qualifications; and to such a one there will always come the opportunity to get about among his suppliers when occasion specially calls for it.

In conclusion, the very nature of our factory managers' vocation demands that they should be progressive. To master their business they must have been studiously inclined, for science plays a large part in their work; and that they are desirous of improving themselves is

shown, if in nothing else, by their regular attendance at this annual conference. Initiative, no doubt, therefore, most of them possess, for it is largely the outcome of concentrated effort. It may thus be safely said that, almost without exception, every manager may have a very decided influence on the output of his factory; and it only remains for each to exercise his faculties in these several directions to practically demonstrate it.

MILLING ALFALFA (LUCERNE) IN CALIFORNIA.

A new phase of the milling industry has come into being in California within the past few years. This is the manufacture of alfalfa meal. At first it had a slow growth, but persistent effort on the part of promoters finally triumphed.

There are five alfalfa milling plants in the State, and alfalfa meal is one of the staple commodities found in nearly every feed store on the Pacific Coast.

It has been discovered that this is the most economical method of putting alfalfa hay on the market.

This class of forage was first put on the market loose; then it was baled, but at best there was much waste. The leafage, which, on being dried, is very tender and brittle, shells badly in handling, and thus the more valuable part of the hay is lost.

In feeding out there was also a waste in roughage. Sheep are inclined to leave the coarser stalks, and these leavings are in some cases fed to cattle, who are not quite so fastidious.

But the grinding of alfalfa hay into meal has not yet been fully adapted to general stock feeding, but as a feed for hogs, dairy cows, and poultry it has been found par excellence. The milling process not only reduces the leafage of the plant to a fine powder, but grinds all the roughage to such a consistency as to be perfectly edible, and thus the entire bulk of the forage is made available for animal food.

The California alfalfa mill thus far is a stationary affair, and the machinery of a very simple character.

It is probable, however, that portable mills will be invented, whereby the alfalfa hay may be converted into meal in the field, and thus a greater saving of fibre be accomplished.

The milling of alfalfa, again, is a very dusty process, and injurious to those operating the mills, who are compelled to not only dampen the hay before being milled, but to wear moistened sponges over their mouths and nostrils while at work. These difficulties will no doubt be obviated by improved mechanical appliances.

The milling of alfalfa hay in California has greatly stimulated the culture of the plant, and the industry is in a very flourishing condition. It is also bringing about improved cultural methods, especially in the way of securing pure culture, as weedy and foul alfalfa will hardly do for conversion into meal.

Alfalfa is packed in 100-lb. sacks, and the commodity at present (December) retails at 95 cents per sack (approximately £4 9s. per ton). —*Milling Journal*, 12th December, 1914.

THE OLIVE.

L. Macdonald, Horticulturist, Agricultural College, Dookie.

(Continued from page 228.)

VARIETIES—*continued.*

In Asia Minor, Tripoli, Algiers, Tunis, and Morocco, where the olive has been cultivated for many generations, it is only to be expected that a great number of varieties exist. Many of these may possibly be worthy of more extensive cultivation than has been attained up to the present. It is probable, also, that some of those specially adapted to the dry lands, in the above-mentioned places, would be suited to our inland areas. An olive of great vigour, drought resisting, prolific, and a high oil yielder is required to withstand the trying conditions of some of our drier regions, and at the same time give profitable returns. Such an olive, if planted with sufficient care, and tended in its early years, would be the means of appreciating the land values of fairly extended areas where the rainfall is not great and irrigation cannot be practised.

It has always been recognised that with olives, as with some other kinds of fruits, certain kinds will succeed better than others in different localities where different conditions prevail. This being so, the problem of the planter is the selection of those kinds that will do best in his region or district, while possessing those qualities that are most sought after in the kind, whether it be for oil or pickles. In selecting such varieties, a review is necessary of the kinds growing successfully in regions where the conditions are similar to those prevailing in the places where planting is intended. This would be the means of at least eliminating one of the factors that has contributed to the failure of some olive orchards.

According to Californian and European experience it has been found that certain varieties, as Oliviere and Navidillo Blanco, which do not succeed well on low-lying, moist lands, give an oil of inferior quality, and in lesser quantities, and are subject to frost injury. The susceptibility to frost injury is, of course, more marked with some varieties than with others, but with the susceptible kinds it appears to be more pronounced under the moist conditions of the valley lands. Others, like Mignolo, Morajolo, Gordal, &c., favour greater elevations, and will thrive in more exposed situations in well-drained land. Such kinds are usually dense, but not tall in growth, and their fruit adheres strongly to the fruit stalks.

An interesting and instructive account is contained in Bulletin No. 125 of the United States Department of Agriculture on dry land olive culture in Northern Africa.* It chiefly refers to the plantations around the city of Sfax, some 200 miles south of Tunis. In this region the average rainfall is 9.3 inches, but this falls, for several years at a time, to an average of 6 inches; yet around this city in 1909-10, 475,000 acres were devoted to olives. This area has probably been increased during the last five years to 500,000 acres. This expansion has been made, despite the fact that the rainfall is scanty, the soil poor, and there is no irrigation (except hand watering in the early years).

It has been due mostly to clean cultural methods, spacious planting and the adoption of the right kind. The Chemlaly variety is the kind

* Dry Land Olive Culture in Northern Africa.—Thomas H. Kearney.

almost exclusively grown. It is remarkable for its drought-resisting qualities, prolificacy, and the abundance of oil it yields. It is a kind that has not yet been introduced here, but it is only reasonable to suppose that it would thrive in the comparatively dry lands here, at least in the northern areas that are served by a 15 to 20 inch rainfall, and possibly in those free soils where the rainfall is between 10 and 15 inches. However, the range of markets for the oil of this kind is not so great as that for some of the European kinds owing to its extraordinarily high percentage of stearin. This quality renders the oil liable to congeal at comparatively high temperature. Thus, in the more temperate and colder climates, this oil cannot be adapted to many of the uses to which olive oil is put. Therefore, the limits of its markets fall short of that of many of our European oils. However, this disadvantage of "freezing" is not noticeable in warm climates, and it is doubtful if it would be a serious obstacle in the marketing of its oil in the greater portion of Australia. The Chemlaly variety, according to the report referred to, gives 30 per cent. of recoverable oil in factories where modern machinery is in use, and 34½ per cent. of oil under chemical extraction tests. This is an exceedingly rich oil test, and, combined with its vigour and ability to thrive under dry conditions, makes this variety one of the most presentable for trial in our dry areas.

There is evidence also that olives were grown over a large area in Northern Africa 1,500 years ago, where the rainfall is only 8 to 14 inches. This rainfall would embrace huge areas of our dry inlands, many of which are rich and permeable, but only lacking in a sufficiency of moisture to assert their latent wealth. However, it is not quite clear at what times the rains fall in this part of Northern Africa, and, of course, without accurate data on this particular point a comparison as to the suitability of our lands cannot be made. It appears to be essential for the olive to obtain good supplies of moisture in spring, about the period of flowering and setting of its fruit: and then again towards the latter part of summer, when the fruit is approaching maturity.

Around Sfax the trees are planted 65 to 80 feet apart, hand-watered and carefully tended in their early years. The watering in the early years is very essential to give the young trees a start. To obtain the necessary water for this purpose wells are sunk at intervals throughout the groves. The wells are taken down with three straight sides and one slanting side from which the water is approached. Once the trees are established thorough cultivation is adopted to conserve all the moisture possible. One man cares for about 225 trees, but where the man possesses a family of several, capable of working, 600 trees can be taken care of.

In his work on the olive, Degrully describes several Algerian and Tunisian varieties, amongst which Chemlaly, Limli, Aaleth yield good oils, whilst Adjeraz, Aberkan, Tefah, Baroumi, Bidh-el-hammam, and several others, of large size, are excellent for pickling. It does not appear as though Northern Africa and Asia Minor have been systematically searched, and the most promising kinds selected and tested in different soils for comparative purposes. Such a search would, no doubt, provide much of interest and value on the olive question, and no doubt reveal some kinds of great economic value.

It would appear by the evidence before me that there are only a limited number of varieties worthy of planting for commercial purposes (oil or pickles) in this country out of the great number of kinds presented to us by European cultivation. Growers must debar the inferior kinds of olives a place as firmly as they do the inferior kinds of apples. The data available in Australia as yet on the economic value of the various kinds is very meagre. In New South Wales some good work has been done, and is, I believe, being continued at different stations, the investigations carried out in this direction at the Wagga Experiment Farm being of special value. In South Australia a considerable number of practical tests have been made from time to time by some of the growers, and valuable records kept. Those obtained from the Beaumont plantation extend back as far as 1875. They show the yield of olives and quantity of oil produced from that plantation for a series of years; the varieties, however, are not carefully separated. So far as Australia is concerned, the best European and African varieties have not yet been tested in the various regions that would probably be suitable for olive culture; *and accurate records kept of their behaviour* in regard to prolificacy, size of fruit, richness in oil, and adaptability to conditions. This is unfortunate, but to some extent inevitable, as the industry is in its infancy. However, a beginning has been made, and it is expected that the next few years will yield some further information on the subject. For the present we are perforce compelled to fall back on the experience gained in California and Europe. European experience appears for the most part to be empirical, and is based more on the practical results obtained in some districts than on accurate laboratory or milling tests. Practical tests with extensive quantities are of great value, probably more value than chemical tests, in showing the recoverable oil content of any kind, but they are somewhat cumbersome for advance work. Such tests as the Provincial European are usually based on individual methods, which naturally vary very much, according to the mechanical effectiveness of different crushers and presses, thoroughness in working, time of picking, &c. To obtain any degree of accuracy for comparative work the same mechanical means for expressing the oil should be used in each case, and the methods of treating the olives and time of picking should also be made to correspond as near as possible.

The transitions that take place in the development of the oil cells in the different varieties have not been accurately ascertained. Some kinds may develop more oil than others after the time which is regarded as the most suitable at which to pick. It is fairly well known that olives as a rule will yield considerably more oil when they are dead ripe than when they have just reached the stage when they may be picked for making fine quality oil.

Again, recoverable oil content is a variable factor, depending greatly on the climatic and soil conditions and on season of pressing. If the weather is cold and frosty, the oil congeals, and will not leave the pulp; hence, early varieties are favoured in some places, even though their absolute oil content may not be as great as other kinds that ripen later; being treated in the warmer weather their oil runs more freely, and they can also be picked with few of the disabilities that accompany winter gathering. If temperatures can be controlled by artificial heating in the mill (this heating should be an important consideration in the design

of every modern oil-making establishment), any disabilities in respect to the hardening of the fats in the pulp may be greatly modified, if not removed.

It has been demonstrated in the extensive tests carried out under the *ægis* of the Californian University, that with some varieties there is a considerable fluctuation in actual oil content. This being so, it is only reasonable to suppose that a similar difference would be found in the recoverable oil from the same kind. The Californian growers, more than others, appear to have fined down the number of kinds worthy of planting for commercial purposes. These have been reduced to about half-a-dozen kinds; in fact, many regard two only as being worthy of consideration, viz.: Broad-leaved-mission and Manzanillo. In Europe it is found that growers still adhere to those kinds that have been grown for many years, generations, and even centuries. This is due in part, perhaps, to their reluctance to part with old trees that have served them well. For instance, we have the Razza, Mignolo, and Correggiola in the provinces of Lucca and Pisa, in Italy; the Verdale in the valley of the Hearault, France: and the Veral Blanco and Navadillo Negro in the province of Jaen, Spain. However, some kinds, like Manganillo, Picholine, Gordal, Oliviere, Pleureur, &c., find more general favour, and are grown through different provinces in different countries. It has been the endeavour here to gather together all the available information as to the vigour, hardihood, prolificacy, and oil-bearing capacity of the various kinds, as shown by their culture in other countries, and to use this experience to our own advantage in establishing groves of only the best kinds. Although different varieties vary in their oil content in different localities, this variation is not so great as the difference in oil content between some kinds.

After giving some consideration to the kinds enumerated, and to those factors that are required in a commercial kind, and knowing that it is neither a good thing for the individual grower nor the industry to adopt too many kinds, we would recommend nurserymen and others to make a selection from the following list, which contains those that possess the greatest credentials for planting here:—

Broad-leaved-mission, Correggiola, Pleureur, Razza, Manzanillo, Picholine, Sevillano, Hardy's Mammoth, Pigale, Pendoulier, Bouteillan, Ascolano, Gordal, Oblitza, Verdale, Herbiquina (?), Chemlaly.

If this list is reduced to a more select choice of kinds for oil and pickles, the following are recommended:—

Oil Varieties—
- Broad-leaved-mission.
- Correggiola.
- Pleureur.
- Razza.

Pickling Varieties—
- Manzanillo.
- Sevillano.
- Picholine.
- Ascolano.

Dual-purposes Varieties—
- Mission.
- Manzanillo.
- Verdale.

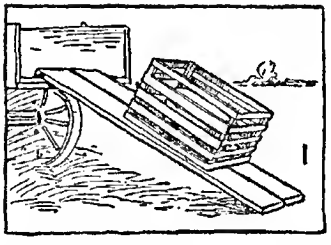
Strong-growing kinds for shelter belts that will give valuable produce are:—Pigale, Oliviere, Navadillo-Blanco, Salouen, Mission.

The kind known as Ackbucke is largely employed as stock, and the Empeitre for hedging purposes. Seedlings of various kinds planted close together are also used for hedging purposes.

(To be continued.)

LOADING HOGS WITH CRATE.

For loading hogs (writes an American farmer) I use a crate without a floor. This I place over the hog or let in through the door in the end. Two planks 10 or 12 feet long are used instead of a chute, one end resting in the end of the waggon box and the other on the ground. I then take hold of the crate and slide it up the planks, with the hog walking backwards, as shown in the illustration. As the



crate touches his nose, he will back up the planks and into the waggon. I then pass a rope over the crate and fasten it down. If the hog is to be loaded into a car, I set one end of the planks on the waggon and the other in the car door, and slide the crate along the planks into the car. I have loaded hogs alone in this way that weighed 600 lbs. A crate used for this purpose should be made with slats close together so that the hog cannot get its nose between them.

VICTORIAN RAINFALL.

First Quarter; Year, 1915.

In the following table is given the average rainfall in each district in Victoria for the first three months of the year, and also for the quarter compared with the normal. For the purposes of this table 180 representative stations have been chosen, mainly with due regard to geographical position of the stations, their general peculiarities with respect to rainfall distribution, and their importance from an agricultural standpoint.

Drougthy conditions with their attendant ills involving great losses in stock still prevailed up to the end of March almost throughout the State, excepting the Gippsland district. The greatest deficiencies with regard to rainfall, it will be noted, prevailed in the Northern Mallee,

and the lower North-East. In fact, in all the Northern areas very little rain had been received, and the want of a good fall was very badly felt, there being no pastures, and hand-feeding of stock and carting of water for domestic purposes being almost universally adopted. Even in the Western districts, where droughty conditions are very rare, the season has been the worst on record. Most of the creeks and rivers were low or had ceased to flow, and feed for stock was scarce. The general outlook was anything but promising, and the severest drought on record in Victoria was being experienced.

But conditions have since somewhat changed, and the gloomy outlook has been dissipated, consequent on the beneficial falls which have visited the State during the period 8th to 12th April. In most cases sufficient rain was received to enable farmers to plough their fields, and prepare for the coming season, the water supplies have been partially replenished and an impetus given to the grass. No improvement has been noted with regard to the flow of rivers.

The most favoured areas were the Central and North Central districts, where the averages for the period were 169 and 146 points respectively; 113 points were received on an average throughout Gippsland, and ranged from 261 at Leongatha to 6 points at Ensay. The Wimmera district mean for the period was 89 points, the Western 88, and the Northern country 80 points. The Mallee district participated to a lesser amount, but more rain is still badly needed in that part of the State. The falls ranged from 37 at Ouyen to 106 points at Rainbow.

District.	——	January.	February.	March.	Quarter.
		Points.	Points.	Points.	Points.
Mallee North	District Mean.. ..	45	0	0	45
	Normal	58	56	80	194
	Per cent. above normal	..	..	..	..
	,, below ,,	−22	−100	−100	−77
Mallee South	District Mean.. ..	52	37	3	92
	Normal	57	67	90	214
	Per cent. above normal	..	..	..	..
	,, below ,,	−9	−45	−97	−57
Northern Wimmera ..	District Mean.. ..	50	16	4	70
	Normal	64	71	105	240
	Per cent. above normal	..	..	..	..
	,, below ,,	−22	−78	−96	−71
Southern Wimmera ..	District Mean.. ..	65	22	16	103
	Normal	93	70	113	276
	Per cent. above normal	..	..	..	..
	,, below ,,	−30	−69	−86	−63
Lower Northern Country	District Mean.. ..	61	44	5	110
	Normal	90	72	114	276
	Per cent. above normal	..	..	..	..
	,, below ,,	−32	−39	−96	−60

VICTORIAN RAINFALL—*continued.*

District.	——	January.	February.	March.	Quarter.
		Points.	Points.	Points.	Points.
Upper Northern Country	District Mean.. ..	71	50	3	124
	Normal	116	88	146	350
	Per cent. above normal	..	..	..	..
	,, below ,,	−39	−43	−98	−65
Lower North-East ..	District Mean.. ..	96	29	19	−144
	Normal	154	139	226	519
	Per cent. above normal	..	..	..	..
	,, below ,,	−38	−79	−92	−72
Upper North-east ..	District Mean.. ..	183	54	42	279
	Normal	217	185	275	677
	Per cent. above normal	..	..	..	..
	,, below ,,	−16	−71	−85	−59
East Gippsland ..	District Mean.. ..	533	58	107	718
	Normal	256	231	222	709
	Per cent. above normal	+116	..	..	..
	,, below ,,	..	−75	−52	+1
West Gippsland ..	District Mean.. ..	196	95	111	402
	Normal	229	169	260	658
	Per cent. above normal	..	..	..	..
	,, below ,,	−14	−44	−57	−39
East Central	District Mean.. ..	194	85	77	356
	Normal	233	183	274	690
	Per cent. above normal	..	..	..	..
	,, below ,,	−17	−54	−72	−49
West Central	District Mean.. ..	152	71	31	254
	Normal	146	122	194	462
	Per cent. above normal	+4	..	..	..
	,, below ,, ..	..	−42	−84	−45
North Central ..	District Mean.. ..	125	105	19	249
	Normal	142	113	174	429
	Per cent. above normal	..	..	..	..
	,, below ,, ..	−12	−7	−89	−42
Volcanic Plains ..	District Mean ..	104	23	41	168
	Normal	139	113	194	446
	Per cent. above normal	..	..	..	..
	,, below ,, ..	−25	−80	−79	−62
West Coast	District Mean.. ..	124	44	124	292
	Normal	148	112	195	455
	Per cent. above normal	..	..	..	..
	,, below ,,	−16	−61	−36	−36

N.B.—100 points = 1 inch.

20th April, 1915.

H. A. HUNT,
Commonwealth Meteorologist.

VICTORIAN AGRICULTURAL STATISTICS.

Area and Produce, 1913–14 and 1914–15.

Name of Crop.	Area.		Produce.		Average per acre.	
	1913–14.	1914–15.	1913–14.	1914–15.	1913–14.	1914–15.
	acres.	acres.	bushels.	bushels.	bushels.	bushels.
Wheat	2,565,861	2,363,535	32,936,215	3,040,947	12·84	1·38
Oats	442,060	434,815	8,890,321	1,698,419	20·14	3·70
Barley (malting)	44,584	31,208	971,334	368,647	21·70	11·79
Barley (other)	38,767	31,224	841,556	231,952	21·71	7·43
Maize	17,062	19,433	800,529	†	44·57	†
Rye	1,779	1,955	19,020	13,415	10·70	6·86
Peas	11,774	12,159	206,846	114,494	17·57	9·42
Grass cut for seed ..	1,452	119	16,349	1,100	11·26	7·38
			tons.	tons.	tons.	tons.
Potatoes (early crop)‡ ..	7,704	6,077	27,121	15,788	3·52	2·60
Potatoes (general crop) ..	66,870	59,418	149,481	†	2·24	†
Mangel-wurzel	952	893	15,642	†	16·43	†
Beet, Carrots, Parsnips, Turnips for fodder	470	570	3,166	†	6·74	†
Onions	6,121	8,937	24,755	†	4·04	†
Hay (wheaten)	220,560	192,502	274,981	96,604	1·25	0·50
Hay (oaten)	729,678	677,805	1,037,174	441,490	1·42	0·65
Hay (lucerne, &c.) ..	27,146	25,298	38,219	30,862	1·39	1·22
Green Fodder	98,963	139,654				
Vines	22,435	23,798*				
Orchards and Gardens ..	67,183	74,302				
Market Gardens	10,777	12,935				
Other Tillage	7,923	8,084*				
Total area under crop ..	4,391,321	4,621,961*				
Land in fallow	1,738,572	1,346,545				
Total Cultivation ..	6,129,893	5,971,506*				

* Subject to slight alteration. † Not yet available. ‡ The early crop relates to potatoes dug before 1st March.

Area Under Potatoes in Principal Counties, 1913–14 and 1914–15.

Principal Counties.	Area in Acres.	
	1913–14.	1914–15.
Bourke	7,951	6,508
Grant	10,557	8,898
Mornington	11,276	12,372
Dalhousie	3,840	3,228
Talbot	8,872	6,804
Villiers	5,708	5,392
Buln Buln	8,031	8,393
Remainder of State	18,339	13,900
Total	74,574	65,495

Office of the Government Statist,
Melbourne, 28th April, 1915.

A. M. LAUGHTON,
Government Statist.

FIFTH VICTORIAN EGG-LAYING COMPETITION, 1915-1916.

Commencing 15th April, 1915; concluding 14th April, 1916.

CONDUCTED AT THE BURNLEY SCHOOL OF HORTICULTURE.

Six Birds. Pen No.	Breed.	Owner.	Totals. 15.4.15 to 14.6 15	15 6 15 to 14 7 15	Three months.	Position in Competition.
		LIGHT BREEDS.				
		WET MASH.				
19	White Leghorns ..	L. G. Broadbent ..	271	117	388	1
53	,, ..	W. G. Swift	244	129	373	2
2	,, ..	E. A. Lawson	244	124	368	3
21	,, ..	E. B. Harris	236	131	367	4
38	.. ..	G. McDonnell	227	137	364	5
5	.. ..	J. J. West	220	132	352	6
8	,, ..	C. J. Jackson	227	113	350	7
42	,, ..	W. M. Bayles	223	123	346	8
7	,, ..	Marville Poultry Farm ..	232	113	345	9
9	.. ..	J. Schwabb	238	107	345	
34	,, ..	H. Mckenzie and Son ..	243	98	341	11
6	,, ..	F. Dobbssen	240	101	341	
10	.. ..	A. E. Tuttleby	201	131	332	13
30	.. ..	A. E. Silbereisen ..	231	97	328	14
18	.. ..	D. Adams	210	116	326	15
16	.. ..	N. Burston	218	102	320	16
26	,, ..	A. Mowatt	205	109	314	17
44	.. ..	*Mrs. F. M Oliver* ..	204	109	313	18
25	.. (5 birds)	Giddy and Son	207	100	307	19
4	.. ..	R. Hay	209	96	305	20
32	.. ..	F. Hodges	210	89	299	21
60	.. ..	H. C. Brock	222	67	289	22
28	.. ..	R. Lethbridge	176	112	288	23
52	,, ..	A. A. Sandland	216	69	285	24
3	.. ..	J. H. Gill	194	90	284	25
1	.. ..	Mrs. H. Stevenson ..	193	90	283	26
50	.. ..	John Hood	169	112	281	27
49	.. ..	Bennett and Chapman ..	159	121	280	28
51	.. (5 birds)	A. H. Mould	206	73	279	29
39	.. ..	W. M. Sewell	206	73	279	
15	.. ..	H. N. H. Mirams ..	176	93	269	31
11	.. ..	J. B. Brigden	163	105	268	32
57	.. ..	B. Mitchell	179	89	268	
33	.. (5 birds)	A. W. Hall	211	55	266	34
23	.. ..	Fulham Park	167	97	264	35
24	..	Lysbeth Poultry Farm ..	156	107	263	36
13	.. ..	T. Hustler	153	105	258	37
43	.. ..	H. I. Merrick	161	99	257	38
36	.. ..	Weldon Poultry Yards ..	183	71	254	39
54	.. ..	W. G. Clingin	151	102	253	40
40	.. ..	C. C. Dunn	165	88	253	
59	.. ..	W. G. Osborne	154	96	250	42
55	.. ..	W. N. O'Mullane ..	154	90	244	43
48	.. ..	C. J. Beatty	167	76	243	44
14	.. ..	W. Flood	144	90	234	45
47	.. ..	J. C. Armstrong ..	160	67	227	46
45	.. ..	South Yan Yean Poultry Farm	130	88	218	47
20	.. ..	R. W. Pope	155	61	216	48
12	.. ..	G. Hayman	141	63	204	49
58	.. ..	Thirkell and Smith ..	117	84	201	50
22	.. ..	S. Buscumb	151	47	198	51
41	.. ..	J. A. Donaldson	112	85	197	52
27	.. ..	J. A. Stahl	90	103	193	53
46	.. ..	R. Berry	159	31	190	54
56	.. (5 birds)	C. Hurst	95	73	168	55
37	.. ..	A. Ross	97	70	167	56
31	.. ..	L. McLean	96	7	103	57
		Total	10,478	5,320	15,798	

FIFTH VICTORIAN EGG-LAYING COMPETITION, 1915–16– *continued.*

Six Birds. Pen No.	Breed.	Owner.	Totals. 15.4.15 to 14.6.15.	15.6.15 to 14.7.15.	Three months.	Position in Competition.
		LIGHT BREEDS.				
		DRY MASH.				
80	White Leghorns ..	W. H. Robbins	280	144	424	1
69	,, ..	E. MacBrown	207	125	332	2
68	,, ..	H. McKenzie and Son ..	213	103	316	3
64	,, ..	W. M. Bayles	229	87	316	
78	,, ..	H. Handbury	193	117	310	5
72	,, ..	Mrs. E. Zimmerman ..	224	73	297	6
79	,, ..	Lysbeth Poultry Farm ..	233	61	294	7
66	,, ..	E. A. Lawson	240	40	280	8
76	,, ..	A. A. Sandland	163	90	253	9
71	,, ..	Moritz Bros.	155	92	247	10
65	,, ..	Thirkell and Smith ..	171	59	230	11
67	,, ..	C. C. Dunn	170	59	229	12
63	,, ..	A. H. Padman	123	78	201	13
62	,, ..	Benwerren Egg Farm ..	183	11	194	14
61	,, ..	Mrs. H. Stevenson ..	71	91	162	15
75	,, ..	Fulham Park	69	87	156	16
74	,, ..	J. H. Gill	61	69	130	17
77	,, ..	South Yan Yean Poultry Farm ..	75	34	109	18
73	,, ..	C. L. Lindrea	34	41	75	19
		Total	3,094	1,461	4,555	
		HEAVY BREEDS.				
		WET MASH.				
81	Black Orpingtons ..	Mrs. T. W. Pearce ..	275	127	402	1
100	,, ..	J. H. Wright	270	128	398	2
97	,, ..	Maryille Poultry Farm ..	241	120	361	3
94	,, (5 birds)	D. Fisher	227	113	340	4
86	,, ..	C. E. Graham	181	153	334	5
90	,, (5 birds)	Oaklands Poultry Farm ..	227	104	331	6
85	,, ..	H. H. Pump	192	134	326	7
88	,, ..	J. McAllan	199	95	294	8
89	Rhode Island Reds	E. W. Hippe	181	110	291	9
87	Black Orpingtons ..	W. C. Spencer	172	113	285	10
99	,, ..	L. McLean	188	93	281	11
91	,, ..	A. Greenhalgh	182	99	281	
96	White Orpingtons ..	Stranks Bros.	201	65	266	13
95	Silver Wyandottes ..	W. H. Forsyth	163	86	249	14
84	Black Orpingtons ..	Cowan Bros.	137	104	241	15
93	,, ..	L. W. Parker	108	125	233	16
83	,, ..	G. Mayberry	126	66	192	17
92	,, ..	J. Ogden	66	103	169	18
98	Faverolles ..	K. Courtenay	38	79	117	19
82	White Wyandottes	J. B. Brigden	—	14	14	20
		Total	3,377	2,031	5,408	

REPORT FOR MONTH ENDING 14TH JULY, 1915.

The weather during the month was cloudy with much north-west wind and light rains. There was an extremely heavy frost on the 14th July, the thermometer registering under 30 degrees Fahrenheit.

The birds have done well for the period, the heavy breeds doing fine work. Quite a number of birds in the light breed section went into the moult. There were also a few broodies.

The rainfall for the month was 233 points.

Department of Agriculture,
Melbourne, Victoria.

A. HART.
Chief Poultry Expert.

ORCHARD AND GARDEN NOTES.

E. E. Prescott, F.L.S., Principal, School of Horticulture, Burnley.

The Orchard.

If the winter spraying has not been carried out, it should be done without delay. One of the most general winter sprays is red oil. The caustic properties of this oil are well known; and in order that no damage shall arise from burnt buds, it is advisable to finish the red oil spraying immediately. Once the buds commence to move, all oil preparations should be kept from the trees. It has previously been stated that a strength of 1 in 30 of red oil is amply sufficient to destroy such pests as Bryobia mite, Scale insects, and Woolly aphis: when the oil is used late in the season, it certainly should not be sprayed at a greater strength than this. Red oil may be emulsified by combining it with soft soap, using 1 lb. of soft soap to 1 gallon of water; or it may be used in combination with lime, using 1½ lbs. lime, dissolved in water, to 1 gallon of oil, afterwards reducing this down wth 30 gallons of water. Many of the red oils now sold are in a prepared form, the oil merely requiring the addition of a small proportion of washing soda to the water before mixing. Crude petroleum or kerosene may also be used in an emulsified form for a winter spray, but general practice has shown that the red oil is the superior of all oil emulsions.

A watch will need to be kept for peach aphis, which makes its advent in the spring. This insect multiplies so rapidly, once it does appear, that, on the first indication of its presence, the trees should be sprayed with a strong tobacco solution. They should be examined on the day after spraying, and if any aphides are still alive, another spraying should be given.

A vigilant watch, and constant sprayings in the early season, will check this pest, and will be the means of saving much time next month, when it will be urgently needed for other works. Peach, almond, and Japanese plum trees are attacked by the peach aphis. This is also the season when Bryobia mite (red spider) is hatching and breeding. If the trees have received an oil emulsion in the winter no danger may be feared from this mite. But if not, an effort must be made to keep it in check by spraying the trees with strong nicotine solution or with one of the proprietary mixtures now on the market. The foliage and young buds are greatly damaged by the attacks of this mite, and so to allow full leaf action, it should be attacked before the flowers and foliage come.

The work of planting will also require to be finished before the end of the month. Indeed, it is not advisable to defer planting even so late. It has often been advanced by growers that late-planted peaches thrive far better than early-planted ones; but it is as well to get the trees in as early as possible, in the event of the season setting in early.

Preparation should now be made for planting oranges and lemon trees. These may be lifted and planted out as soon as the season sets

in warm; but the soil should be thoroughly drained and sweetened before these trees are planted in their permanent positions. No trees require so thoroughly an aerated soil as the citrus family, and to insure successful growth, the ground should be placed in good heart before planting. Although planting this class of fruit trees may be delayed until mid-summer, it is advisable to plant them as soon as the soil is warm enough to induce new root growth, so that they may thoroughly establish themselves during the first season.

Vegetable Garden.

The work in this section during the month of August is comparatively light, provided that it has previously been kept up to date. The soil should be mellowing and sweetening, in anticipation of the planting of the main crop in a little while.

Seeds of lettuce, tomato, cabbage, peas, radish, and broad beans may now be sown. Potatoes may be planted out. Where a frame and hot-bed are in use celery, cucumber, vegetable marrow, tomato, and pumpkin seeds may be planted.

All seedlings ready for planting out, such as cabbage, cauliflower, onion, and lettuce may now be planted in the beds. Herbs of all descriptions should be sown.

Flower Garden.

Rose pruning should now be completed. At this time the buds are beginning to swell and to show some prominence, and no check should be put in the way of their full development. A careful watch should be kept for the appearance of aphis, which should be washed off as soon as it is noticed. It is advisable to have a specific always on hand, ready made up, so as to kill the aphis when noticed. The aphis is a very rapid breeder, and delay for a few days means an enormous increase of this pest. Quite a number of specifics are useful in combating the aphis—soaperine, tobacco emulsion, strong soap suds, Robinson's pine spray, and pestend solution are among the useful remedies. Whatever is used, a good application should be given, and it should be repeated at frequent intervals if the aphides remain.

All herbaceous and similar plants may now be planted out in the beds; these include delphinium, cannas, shasta daisy, rudbeckias, salvias, perennial phlox, &c. These plants should be well fed, so as to allow them to make a rapid and vigorous growth.

Weeds will need frequent attention, as they must be kept in check at this time of the year; they should be prevented from seeding in the beds.

The planting out of shrubs may now be continued and completed as early as possible, so as to allow the roots to get a good hold of the soil before the hot weather sets in. Gladioli may be planted for early flowering, and as well a few divisions of tubers of dahlias.

WINTER FLOWERS.

In the months of June and July flowers are less abundant in the garden than at any other time. All the rest of the year the gardener has no difficulty in obtaining cut flowers.

There are quite a number of shrubs and some plants which produce an abundance of blossom in the winter time, and most of these may now be planted.

The old and well-known scarlet favourite, Japanese Quince, Pyrus Japonica, with its pink and white varieties, can always be relied upon for flowers. The many pink and white varieties of the Japanese Quince and Apricot fill the garden with beauty and fragrance in June and July. These shrubs should be more cultivated than they have been.

Libouia floribunda, a dwarf growing plant, produces a number of scarlet and yellow blossoms, and with its dark foliage it has not been inaptly named, the Belgian flower.

Jonquils, Snowflakes, Camellias, Violets are all in flower at this time; one species of Camellia, C. sasanqua, is very beautiful, with its abundance of bright pink flowers. There is also a variety with variegated foliage. The tree heath, Erica arborea, and as well many other Ericas, produce their flowers in the winter; and the Cape Wedding flower, Dombeya Natalensis, is always a mass of snowy bloom, except when the frost browns the flowers. Several species of Hambrothamus, the old-fashioned Margnerite, with the new double variety, Mrs. Sander; Berberis Darwinnii, with its orange blooms; several species of Abutilon; several species of Cassia; Jasminum primulinum, the yellow Jasmine, are all plants producing winter flowers. The winter flowering Iris stylosa will produce a great quantity of blooms from May to September, and is always a good plant for brightening the garden in the dull season. Eucalyptus Lehmannii is fairly dwarf growing, and may be planted in large shrubberies; while Acacia retinodes, A. podylariæfolia, are also winter flowering species. So that if a selection be made from the above plants the garden will produce its beauty in the winter as well as at any other time.

REMINDERS FOR SEPTEMBER.

LIVE STOCK.

Horses.—Still continue to feed stabled horses well; feed green stuff if available. Continue rugging to encourage the shedding of the coat: good grooming will also be beneficial. Continue giving hay or straw to grass-fed working horses. Feed old and badly-conditioned horses liberally. In foal mares due to foal early, if worked, should be turned out to paddock. Feed stallions doing stud duty liberally. Equivalent amount of cracked Indian corn (maize) may with advantage be substituted for oats, if latter grain is scarce.

Cattle.—Cows should still be rugged, but coverings should be removed frequently, in order to enable the animal to get rid of the old coat: or, better still, a good curry-combing may be given. Continue hay or straw. Look up treatment for milk fever in *Year-Book of Agriculture*, 1905, and treat cattle accordingly. Give calves a good warm dry shed. Give the milk to young calves at blood heat. Have feeding troughs or buckets clean. Don't over-feed. Feed regularly with regard to quantity and time. Provide a good grass run, or fine hay or crushed oats in a box or trough. Give a cupful of limewater per calf per day in the milk.

Pigs.—Supply plenty of bedding in warm well-ventilated sties. Keep sties clean and dry, and feeding troughs clean and wholesome. Sows may now be turned into grass run. If pigs are lousy dress with kerosene emulsion or

sulphur and lard, rubbing well into crevices of skin, and disinfect sties. Considering the present high price of pork, there should be a good margin of profit *in fattening* pigs, even at the *high* price asked for feed. (*See* page 447, *Journal of Agriculture* for July, 1915.) Worms are very prevalent at present, and may be treated by giving 2 to 10 grains of Santonin in form of pill, or from half to one teaspoonful of oil of turpentine in milk or castor oil.

Sheep.—Wherever early shearing is possible, and shelter available, all sheep to be disposed of can be fattened earlier, if shorn. Lambs not good enough for freezing also thrive better after being shorn. Where sufficient knowledge of grading cross-bred wool exists, draft the coarse sheep from the fine before coming into the shed, and shear and bale separately. Clean all daggy sheep before bringing them on to the shearing board. Avoid deep and careless skirting. Only heavy fribs and stains should come off fleeces. Press in a box press, which forms square sides to bales, and avoid round bales, called "Sew Downs." Brand boldly and neatly on the long and narrow side. Clean carefully all straw, chaff, &c., from shearing place. Cut back all misshapen feet when noticed during shearing.

Poultry.—September is one of the best months for hatching for winter eggs. Incubators should be kept going, and broody hens set. Care must be taken to keep down vermin, as they now breed quickly: use sprays in houses and Insecti-bane or Izal in nests—nothing stunts chickens quicker than vermin. The food for young chicks should be fine oatmeal, stale bread crumbs or biscuit meal, a little calcined bird's grit, a little chopped green stuff such as lettuce, thistles, or green lucerne or spring onions occasionally cut fine is a good tonic, and a pinch of powdered charcoal. Slightly moisten with new milk. Make the whole friable, and feed frequently ("little and often") just as much as they will readily eat, as an excess of food only sours and disturbs their digestive organs. Animal food may be given in small quantities after the first ten days once or twice a week. Chickens should be protected from damp ground and the cold, bleak winds.

CULTIVATION.

Farm.—Plant early potatoes, and work up fallow for the main crop. Keep fallow for summer forage crops well worked up with the disc and harrows. Make early sowings of mangolds, beet, field carrots, and turnips. Push on with the fallowing in the Northern Districts. Prepare land for tobacco seed beds by burning rubbish on the site: afterwards work up to depth of three or four inches.

Orchard.—*Commence spring ploughing: plough in leguminous crops for* green manure as soon as the plants are in full flower. Finish grafting early in the month. Spray peach and apricot trees with Bordeaux mixture as the blossom buds are opening, as a preventive against "leaf curl" and "shot hole" fungi; watch for peach aphis, and spray when present with tobacco solution.

Flower Garden.—Cultivate and work up the surface to a fine tilth—clear out all weeds. Water newly-planted shrubs, &c., if the weather is dry. Plant out cannas, early dahlias, chrysanthemums, gladioli, and other herbaceous plants.

Vegetable Garden.—Plant out seedlings. Sow seeds for summer use, such as tomatoes, cucumbers, marrows, pumpkins, melons, &c. Plant out tomatoes, and shelter till frosts are over. Hoe and work up the soil surface.

Vineyard.—Plantation of young vines (grafted or ungrafted) should be concluded before the commencement of September: pruning of old vines likewise, as well as tying down of rods on long-pruned vines. Prune recently-planted vines just before buds commence to swell (if not pruned when planted), cutting strongest cane back to two buds. Do not delay this work until buds have shot, as this seriously weakens the young vine. Field grafting may be carried out, if weather be fine and warm. If cold and wet, postpone until October. Swab with acid iron sulphate vines which showed signs of Black Spot last season. To avoid burning, this must be completed before the buds commence to swell. Cultivation (scarifying or diseing) must receive attention when soil is in suitable condition.

Cellar.—Conclude spring racking early in month, if not already done. Fill up, regularly, all unfortified wines.